ZOE

A BIOLOGICAL JOURNAL.

PUBLISHED QUARTERLY.

VOL. II. APRIL, 1891. No. 1.

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SAN FRANCISCO:

ZOE PUBLISHING COMPANY,

P. O. BOX 2114.

Entered at the Post Office at San Francisco as Second-Class matter, May 20, 1890.

Yearly Subscription, $2.00
Single Copy, 75 cts.

ZOE

A BIOLOGICAL JOURNAL.

Published Quarterly by the

ZOE PUBLISHING COMPANY, San Francisco, Cal.

Subscriptions, $2.00 Per Year; Single Numbers, 75 Cents.

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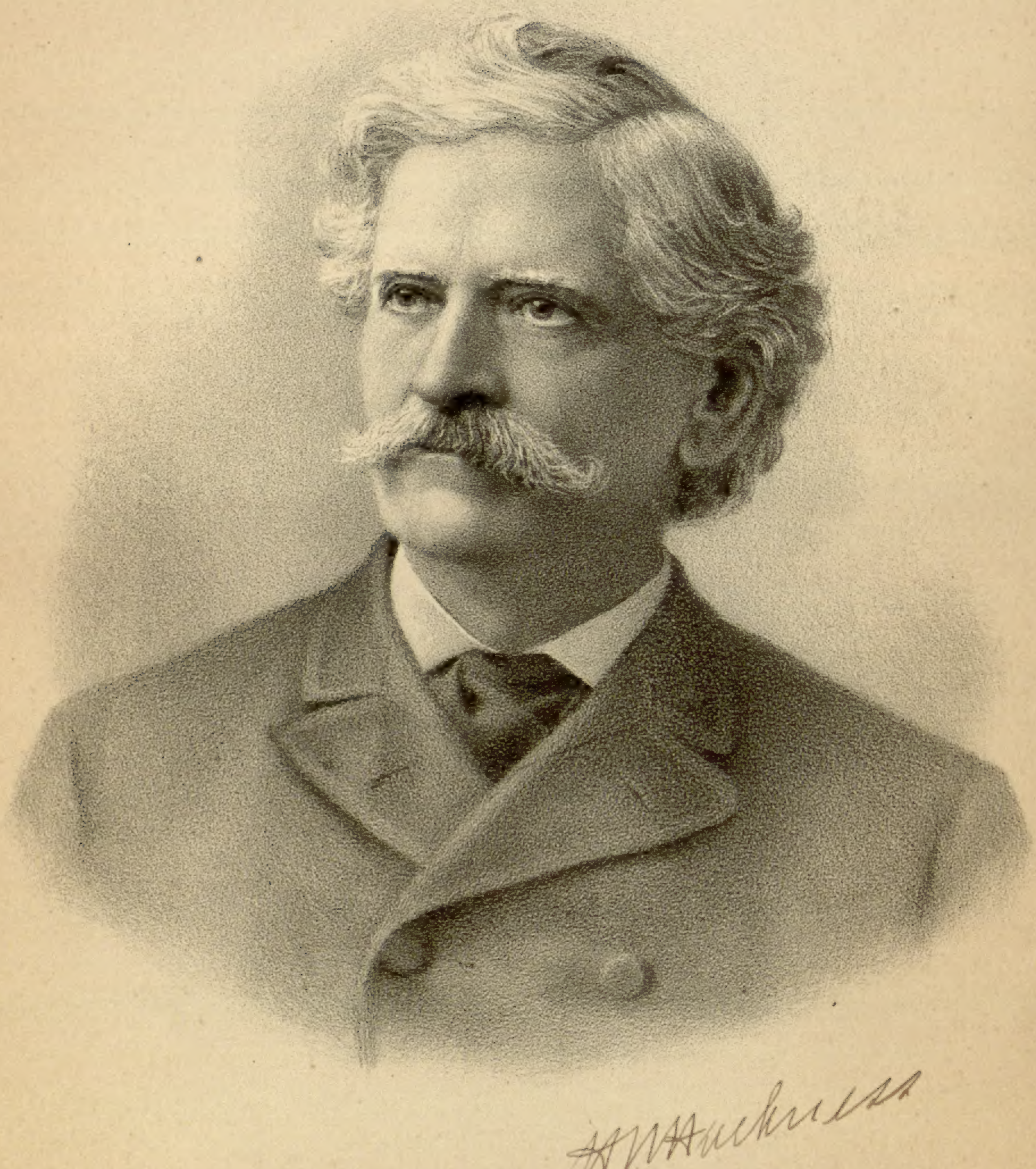
Volume I, pps. vi, 384, plate i-xii, price $2.00, may be obtained from the publishers.



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HARVEY WILLSON HARKNESS.

The subject of this sketch was born in the town of Pelham, Massachusetts, on the twenty-fifth day of May, in the year 1821. His parents, of Scottish origin, were blessed with a large family and small means, and the boys following the usual custom of the rural population in those days, worked upon the farm in summer, attending the best accessible schools in winter. Harvey, the seventh child, being of a more than usually studious turn, sought eagerly for opportunities of instruction, and following his strong inclination, entered upon the study of the profession which was to be his life work, receiving his degree in medicine from the Berkshire Medical College of Massachusetts in the year 1847.

His youth was overshadowed, and the foundation laid for that melancholy often observable even in gayer moments, by that fell blight of New England—consumption. One by one he saw his brothers and sisters, starting with every promise of vigorous life, fade away as they reached maturity, and it was as much for the milder climate as for the allurements of wealth that he joined a party of emigrants at Rock Island, Illinois, reaching California by the tedious journey across the plains in October, 1849.

He first located at Bidwell's Bar, in the practice of his profession, removing the next year to Sacramento, at which place he spent the succeeding years in the busy life of a physician until his retirement in 1869 with a well earned competence. Since that period he has lived for the greater part of the time in San Francisco, but has made several visits to the Eastern States, four to Europe and two to Northern Africa.

On the tenth of May, 1869, he assisted in laying the rail which completed the first transcontinental railroad, presenting on behalf of the State of California the gold spikes used in the ceremony, and on the seventeenth of November, in the same year, was pres-

ent as an invited guest of the Viceroy of Egypt at the opening of the Suez Canal.

He took an early and active interest in the cause of education, was prominent in the organization of the school department of Sacramento, and was elected in 1853 the first president of the local board of education.

His connection with the California Academy of Sciences dates from the year 1875. and for the last five years he has been its President, sacrificing to its interest and advancement all his time, attention and energy.

The scientific labors of Dr. Harkness have been directed to the lower Cryptogams—chiefly to fungi of the Pacific Coast. His writings on the subject are to be found in the Bulletins and Proceedings of the California Academy of Sciences, Grevillea and other journals. His valuable collection containing the types of many species, as well as the large additions made by purchase and exchange, aggregating 10,000 species, have been recently conveyed by gift to the California Academy of Sciences.

Dr. Harkness was married in 1854 to Miss Amelia Griswold. Her death in the first year of their union, under particularly painful circumstances, was a bitter grief, which time could only assuage but never remove.

BOTANICAL REMINISCENCES.

BY H. H. BEHR.

The nativity of some Californian plants is at present a matter of controversy. The birthplace of a single or a limited number of species may appear of such trivial importance as to be beneath serious notice, but as part of a totality of facts it is worthy even in isolation of our closest attention. We must consider it the duty of each generation to record as many of such facts as possible not only in regard to the geographical distribution of species, but to its historic existence in certain localities as well.

The botanists of former generations have done but little iu this respect, being apparently under the impression that the distribution of vegetable life on this planet was as unchangeable as they considered the species to be; and in consequence many of the peculiarities of plant distribution cannot now be explained at all and others form the subject of more or less heated controversies.

As I am at present one of the comparatively few and almost daily decreasing survivors of the earlier days of California, and, perhaps, with the exception of Prince Paul of Wurtemburg, the only one who found time in the years 1850 and 1851, during the gold fever, to pay attention to things that were not mineral, I consider it my duty to make record of my observations and experiences in this as well as in other countries newly opened for settlement, and calculated to shed some light on the *modus operandi* used by nature in changing the flora of a district previously little or not at all disturbed by agriculture or by commercial intercourse.

The wind-swept hills of San Francisco have apparently always been rather deficient in trees, but in places somewhat sheltered from the blasts a considerable number were formerly to be found. The scrub of *Quercus agrifolia* now to be seen in the park fairly represents the oak vegetation, though occasional trees of greater size were to be seen. The buckeye grew in some localities into large trees, like those examples now growing in Sausalito, near the mouth of Wildwood Glen. Near Mountain Lake there were formerly entangled thickets of *Myrica Californica*, and the bay shore from Fort Point inward was fringed with laurel *(Umbellularia California)* which grew to large size, mixed with thickets of *Garrya*, *Sambucus*, etc., and the hill tops were crowned by a very extensive chaparal of robust *Ceanothus thyrsiflorus*. No conifers anywhere in the region covered by the city proper came under my eye with the exception of a few small ones on Lone Mountain; across the bay, however, the Contra Costa Hills were fringed with redwoods of such dimensions that the separate trees could be distinguished from this place. In my botanical rambles, which frequently became scrambles, I often came upon the camps of woodchoppers, hidden away among the tangled thickets of brushwood, their habitants, usually French or Italians, turning an honest penny by supplying the infant city with fire wood.

The destruction of the trees and shrubs, draining and filling up the swamps and lakes, etc., has of course banished many of our species, one of which, *Alsine palustris*, has not been found elsewhere. The columbine *(Aquilegia truncata)* and Thalictrum formerly grew on Telegraph Hill. *Ranunculus muricatus*, now so abundant in swampy places about the Presidio and the Marine Hospital, I first observed about 1860. *Acæna trifida*, a Chilian species of a

very limited range in California, was apparently as abundant on the grassy summits of hills when I first reached the State as it is now. *Berberis pinnata* and *Ribes Menziesii* were abundant in the hills beyond the Mission, the latter, the prickly-fruited gooseberry, found also in many other places near the heart of the city. *Spiræa discolor* was found near North Beach and a single tree of the Box Elder (*Negundo Californicum*) on the hills near Polk street. *Sphacele calycina* grew on Second street near Fremont; and near a resort called Sans Souci, somewhere about the site of the Protestant Orphan Asylum, there grew the tall form of Manzanita still found so abundantly on the slopes of Tamalpais. The prostate species, *Arctostaphylos pumila*, once abundant still survives in a few localities, principally in Laurel Hill Cemetery, but will probably disappear shortly. Neither water cress nor the duckweed (*Lemna*), so often associated with it, were found in our streams when I first saw them.

Near the formerly well known Russ Gardens there were extensive marshes abounding especially about their borders in interesting plants. Here grew the large-flowered dogwood (*Cornus Nuttallii*), the buckbean (*Menyanthes trifoliata*), *Epipactis gigantea*, the delightfully fragrant *Habenaria leucostachys*, and *Eriophorum gracile*. In the same vicinity I found in a single locality five specimens of *Botrychium ternatum*; and the Lady-fern (*Asplenium filix-fœmina*), grew luxuriantly, often forming rootstocks two feet high, simulating tree ferns.

Next to the sudden disappearance of Azolla which between the years 1851 and 1854 was almost entirely superseded by *Cotula coronopifolia*, my attention was attracted by an analagous spreading of a Lavatera which first came under my notice in September, 1850, in the garden of a Mr. Tittel. The locality was a little spot protected from the drifting sand of the dunes which at that time covered Kearny street, between Pine and Bush, and the sight of its rosy blossoms and succulent leaves often refreshed my eyes wearied by dying chapparal and barren sand. Mr. Tittel told me that he had bought the seed from an Irishman, who kept what was then called a Half-way House at the Mission Dolores. I did not pay much attention to the matter as I was under the impression that the plant, which reminded me very much of Lavateras cultivated at the botanical gardens of the University of Wurzburg, was intro-

duced. This impression was confirmed by the statement of the Mediterranean origin of the genus, in Endlicher's Genera Plantarum which, with a few volumes of Linnæa, formed at that time my whole botanical library and probably all the accessible botanical literature of California as well.

The date of my first interview with Lavatera in San Francisco is fixed in my mind by the cholera epidemic that devastated the city in the last months of 1850. I observed the plant exactly two Sundays before the Sunday on which my first cholera case occurred.

The hard work and excitement incident to the epidemic, the great conflagrations and the Vigilance Committee materially interfered with my biological observations, but in regard to Lavatera I recollect distinctly that the little garden spot, near Kearny street, remained the only locality in which the plant was seen, nor did I in my field excursions ever strike the garden in the Mission Dolores from which the plants in Mr. Tittel's garden originated. No special search was made, however, for the reason above given.

In the year 1853 I left for a visit to Europe and returning in 1854 found the aspect of the surroundings materially changed in regard to vegetation; the inhabitants having to some extent given up their migratory habits had taken to embellishing their homes, and especially in the suburbs little garden spots with introduced ornamental plants had become numerous. The marshes and the luxuriant vegetation of their borders were nearly intact, but the impenetrable thickets of *Ceanothus thyrsiflorus* which originally covered the dry hills between the city and the Presidio had been much thinned out and the nearer ones entirely destroyed. The ground thus laid bare had not been cultivated; most of it was rather poor soil, apparently intended by nature to grow houses rather than grain, and in the interim furnished a home for luxuriant masses of the milk-thistle *(Silybum marianum)* not a single specimen of which had been seen during my previous residence. The clear brooks covered with a mossy vail of Azolla had changed to muddy pools filled with *Cotula coronopifolia* (called by the children "brass buttons"), hiding a liquid of the color and consistence of café au lait. Lavatera was at this time generally employed as a hedge about the gardens, but as I had witnessed the sudden invasion of South Australia by the Silybum and Cotula mentioned above I considered the spread of Lavatera an analagous circumstance and only wondered that I never found specimens away from the gardens.

My idea that the Lavatera like Silybum, was of Mediterranean origin was changed in 1854 by the distinct statement of my lamented friend, Dr. Albert Kellogg. It is true that the botanical literature at his command was even more scanty than mine, but he had seen more of the country, and consequently knew more of its flora than I who by my professional duties was bound to an area not exceeding two days travel from San Francisco. As he was convinced that the plant occurred in a wild state he described it, and I have a lively recollection of protesting against the Latin of its specific name "assurgentiflora," and also of informing him that the graceful curve of the pedicel which was the occasion of the name was not a peculiarity of the species.

The discovery of three more species on the islands of the California coast, would go to prove that a center must have existed from which the Californian species of Lavatera radiated, like the Mediterranean one from which radiated *L. Thuringiaca* as far north as central Germany, and *L. acerifolia*, so closely related to our species, as far west as the Canary Islands. To the scientist of evolutionary tendencies the co-existence of two such biological centers isolated by so great a distance as half the circumference of our globe, as is the case with regard to the Lavateras, presents one of the most interesting philosophical problems.

In questions of this kind the absence of botanical gardens is to be much regretted. Those of Melbourne, Sydney and Adelaide have solved by simple experiment nearly all questions of this kind relating to the Australian flora, in its pre-colonial history and the agricultural and pastoral influences to which it became exposed. The cultivation of the Mediterranean species of Lavatera in a botanical garden would certainly solve the question of the relationship of our forms and save us a great amount of fruitless discussion and ink.

OREGON'S IMPORTED SONGSTERS.

BY A. W. ANTHONY.

Sometime in the year 1888 a society was formed in Oregon for the importation of European song birds. This organization was composed largely of the German citizens of Portland, having as its President Mr. Frank Dekum, President of the Portland Savings Bank; Mr. C. F. Pfluger, Secretary, and Mr. F. Bickel, Treasurer.

Contract was made with a resident of the Herz Mountains to capture and bring to Portland in the spring of 1889 one thousand birds, embracing from ten to twenty-five pairs each of sky lark, starling, nightingale, gray thrush, black thrush, ring auzel, black-headed nightingale, linnet, bullfinch, chaffinch, goldfinch, greenfinch and European quail. It was the intention of the society to make the first shipment largely experimental, and, if successful in naturalizing those first introduced, to make other importations later.

The first shipment of birds reached Portland in May, 1889, and consisted, I was told by Mr. Pfluger, of nine pair of black-headed nightingales (*Sylvia melanocephala?*)*, one pair of nightingales (*Luscinia philomela*), the rest having died; sixteen pair of black thrushes (*Turdus merula*), eight pair of song thrushes (*T. musicus*), forty pair of goldfinches (*Carduelis carduelis*), nineteen bullfinches (*Pyrrhula rubicilla*), of which sixteen were males, most of the females having died before reaching Portland; forty pair of greenfinches (*Chrysomitris spinus?*), thirty-five pair chaffinches (*Fringilla cœlebs*), thirty-six pair linnets (*F. cannabina*), twenty-one pair crossbills (*Loxia curvirostra*), twenty pair starlings (*Sturnus vulgaris*), eighteen pair skylarks (*Alauda arvensis*), and five pair of European quail (*Coturnix coturnix*).

The quail and six pair of skylarks were released near Salem, a few larks and starlings near McMinnville, Yamhill County, and the remainder of the shipment at and near Portland.

Regarding the success of the experiment little can be said at this early day; many of the birds undoubtedly returned in the spring of 1890 to the vicinity of their haunts of the preceding summer, as starlings were reported from McMinnville and quail and larks from Salem, upon good authority. The goldfinches and larks are said to have done well about Portland, and to have increased largely; black thrushes were also reported. Owing, however, to conflicting testimony it is very difficult to get any reliable information regarding the different species, few people being able to discriminate

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*For the identification of the species mentioned in this paper I am obliged to depend partly upon the descriptions of the birds, as given me by Messrs. Dekum and Pfluger and partly upon a colored print and list of the species which appeared in "The West Shore" for March, 1889. Some doubt exists in several cases as to what species was introduced, and in such cases an interrogation mark follows the technical name.

between the imported and native species. As an illustration: In March, 1884, I was frequently told by different parties, of a finch that had been imported from Japan and become naturalized in the vicinity of Portland. Its history was well-known to the majority of Portland business men, the only difference in their testimony being that about half of them reported the bird as coming from Australia. Several of my informants went so far as to say that they were present when the birds were released. It was some time before I was able to find a specimen of this *rara avis*, and what was my surprise to discover that the Australian-Japanese importation was the common evening grosbeak (*Coccothraustes vespertina*). Capt. Chas. E. Bendire, in a letter received during the fall of 1884, refers to the same story and informed me that he had investigated it with the same result. Whether some species had actually been brought to Portland, from a foreign country, and the evening grosbeak been confounded with it, I was unable to decide, but think the story was without foundation.

In 1890, while collecting data regarding the species imported from Germany, I encountered my friend the grosbeak in a new role; many of the persons of whom I sought information told me that the city was full of "German finches," "they could be seen about the maples anywhere." With a spirit of accommodation that was quite to be admired, *Coccothraustes* was doing its best to enact the part of *Carduelis*, *Pyrrhula* and *Loxia*, and as far as my inquiries went giving perfect satisfaction.

I was frequently told of the great increase in bird music since the arrival of the German songsters, and many newspaper articles refer to the beneficial effects. A clipping from the San Francisco *Call* of January 1, 1891, lies before me and is, perhaps, a fair sample, from which I copy the following: "It is now no uncommon sight in the vicinity of Portland and different parts of Oregon to see skylarks caroling far up in the air, thrushes singing among the trees, and finches and linnets near the houses, also singing as sweetly as in their native haunts. Near Portland the songs of nightingales have been heard after dark during all summer."

As for my personal experience during the past season (1890), in the vicinity of Portland, I did not hear a single song that I could not identify as proceeding from some of our native species. The region from which the goldfinches and skylarks were reported was not visited, however.

I found a universal disposition, upon the part of the people of Portland and vicinity, to give to the imported species credit for every bird note heard. It is not probable that the single pair of *Luscinia philomela*, even if they survived after being released, furnished music for the entire region about Portland, and yet I found plenty who in all sincerity informed me that nightingales had sung about their homes every night during the spring and summer of 1890.

Credit in this case is, in all probability, due to the russet-backed thrush *(Turdus ustulatus)*, which is very abundant in the Willamette Valley, and is much given to singing during the long twililight hours of early summer.

The "West Shore," of March, 1889, in an article relating to the Society for the Importation of European Song Birds says: "Among the first to appreciate the action of this society were members of the Oregon Alpine Club, who at once took steps to supplement it by bringing from the Eastern States several of the most desirable song birds, such as the famous mocking bird of the south, the cardinal grosbeak or red bird and the joyous bobolink. These birds, also, will arrive early in the spring, and will receive, as will also the others, the fostering attention of the club and the German society until they can propagate in sufficient numbers to be past all danger of extinction."

I was unable to learn whether the Eastern species had been obtained, but think that they were not released with the German importation.

Mr. Frank Dekum also informed me that a prominent Chinese merchant of Portland had ordered a number of song birds from his native country, as a personal contribution to the list of Oregon's songsters; his first effort in this direction was not successful, owing to the absence of a proper person to care for them on shipboard. The birds had been sent for a second time, however, and would reach Portland, it was hoped, in time to be released before the nesting season of 1891.

This formidable array of importations would suggest to one unacquainted with ornithology of Oregon, a singular absence of native song birds. This is far from being the case. A glance at a list of the birds of that State will show such noted songsters as the russet-backed and dwarf thrushes, western robin, winter, and Parkmann's

wrens; yellow, Audubon's, black-throated-gray, Townsend's, hermit and Macgillivray's warblers; warbling and Cassins vireos, purple martin, Californian purple finch, vesper and Gambel's sparrows; Bullock's oriole and a score of others, all more or less common, and many of them abundant throughout the Willamette Valley and vicinity of Portland. And to such as believe that "America is a country where the flowers have no scent and the birds no song"—a phrase frequently heard while discussing, with residents of Portland, the merits of the imported species—I would suggest that a visit be made some morning in May to any wooded thicket or ravine in northwestern Oregon, where a chorus of bird music will be heard that will convince the most skeptical that Oregon's native songsters are, at least, worthy of more than passing consideration.

As for the desirability of these European species, economically and otherwise, the writer has but little to say, being entirely unacquainted with the birds in their native haunts; there is no good reason, however, why they should be otherwise than beneficial to the farmer and horticulturist, as well as adding to the already rich and varied avi-fauna of Oregon a number of new and interesting species. It will be especially interesting to the ornithologist to note the effect upon the allied native species. The Oregon *Loxia curvirostra bendirei* is not so far removed from the imported *Loxia curvirostra* as to be past all danger of interbreeding.

As for the birds offered by the Alpine Club, comment is hardly necessary; both the mocking bird and bobolink are birds that could not be expected to thrive in the heavy fir forests of the Columbia' and it would not be strange if they declined to return after the first migration.

It would be difficult to say too much in praise of the motive that has prompted Mr. Dekum and his associates in presenting to the people of Oregon this handsome addition to their list of feathered songsters. It is nothing new to take from one part of the globe to another game birds or fish that the sportsman may find better and cheaper amusement, but the moving impulse has usually been of a sordid and unsentimental nature. In the action of this society, however, there has been no thought of pecuniary gain and all considerations but those of sentiment have been cast aside.

It is plain that in many respects a lack of judgment has been shown in the selection of species, several of which could hardly be

expected to thrive in that part of the world; it would, therefore, be wise to watch carefully the results of this first experiment before making further importations, and also to take counsel of responsible naturalists before introducing other species, the desirability of which is not assured.

THE PLANTS PECULIAR TO MAGDALENA AND SANTA MARGARITA ISLANDS.

BY T. S. BRANDGEE.

Magdalena Island, so called, is a low ridge joined by a very narrow strip of sand to the mountain known as Cabo San Lazaro, from which a low line of sand between the lagoon and the ocean is continued to the Boca de Soledad. No one has ever collected plants upon Cape St. Lazarus, but probably its flora would differ little from that of these islands.

Santa Margarita Island is formed of two large mountains, separated by a lowland having little elevation above the sea. Magdalena is separated from the mainland by the width of the bay—a distance of about fourteen miles—but to the northward the sand strips reach within a mile of the sand of the mainland. Santa Margarita, separated from Magdalena only about nine miles, near its southern extremity also approaches close to the mainland. There are, apparently, a few species peculiar to these islands—local species or insular species as they may be called. The short distance between the islands and the mainland would not afford a barrier to the distribution of most plants, and those not known elsewhere are really inhabitants of a separated mountain range of a different geological formation. The adjoining coast is low, level and sandy, and the central mountains of the peninsula are at least thirty miles away; at the south no ridges approach the coast until Todos Santos is reached, and at the north the mountains near the coast at San Gregorio are more than a hundred miles distant. These islands are masses of a rock different from that of the nearest mountains of the peninsula, and separated from them by a wide extent of low sandy country. From their size and position it might be supposed that a large number of species would prove to be peculiar to these islands, but such is not the case. While collecting plants extensively in the region, I have seen nearly every species of these islands growing on the ad-

jacent mainland or in the mountains to the north of them. A very few, however, have been found in no other locallty, and these are inhabitants of the rocks. One of the most showy and interesting is *Gongylocarpus fruticulosus*, which is so conspicuous that it could not have been passed over in other localities. *Mamillaria Halei* and *Agave Margaritæ* will probably be found in no other locality. *Brickellia hastata* may be peculiar to these islands; so also may be *Viguiera subincisa.*

And these species complete the list, which is more likely to be diminished than increased.

NEW PLANTS FROM ARIZONA, UTAH AND NEVADA.

BY MARCUS E. JONES.

ASTRAGALUS MOENCOPPENSIS. Densely tufted from a much branched woody root; one foot high, branched, glabrous or slightly pubescent with scattered hairs, young leaves more pubescent; stipules scarious, small, broadly triangular, not free, generally with a tuft of white hairs at the tip; leaves 4 to 8 inches long, petiole half the length, generally grooved; leaflets about 5 pairs, linear or narrower, one inch or less long, acute, somewhat narrowed at the base; peduncles 8 to 12 inches long, racemose-spicate on the upper half, flowers spreading; bracts a line long, ovate or lanceolate, acuminate, hairy; pedicels half a line long; calyx very hairy with entangled white hairs, campanulate, about 2 lines long, equaling or slightly exceeding the subulate lobes; flowers purple, surpassing the calyx lobes by 1 to 2 lines; pods erect or even reflexed, barely equaling the calyx lobes, 3 lines long by 1½ wide, one-celled, obcompressed to such an extent that the cross-section is nearly linear, hoary, oblong-oval, acute, sessile, both sutures prominent, the ventral more so, scarcely sulcate ventrally, not at all dorsally.

Collected June 11, 1890, on limestone cliffs, at Willow Springs, near the Moencoppa, in northern Arizona.

ASTRAGALUS SOPHOROIDES. Perennial but flowering the first year, silvery silky all over even to the stipules, but the calyx with rather coarse pubescence, the hairs on the calyx inclined to be entangled and those on the pods shorter and entangled; plants 3 to 12 inches high, many stemmed, erect or ascending; stipules free from the petiole and connate, even to the top of the stem, scarious, large,

upper part acuminate-triangular; leaves 3 to 4 inches long, the stout petiole being 1 to 1½ inches long; leaflets 4 to 7 pairs, oblong-linear or narrowly oblong, rounded at top and cuneate at base, 1 to 4 lines wide and 6 to 16 long; earliest peduncles very short, ½ to 1 inch long, spike 1 to 2 inches long, and so appearing sessile among the leaves as in *Sophora sericea*, later peduncles often 4 inches long and the spikes 3 inches in addition, latest peduncles as short as the earliest ones; bracts scarious, ovate or lanceolate, acuminate, as long as the calyx tube, hirsute; calyx campanulate, equaling the subulate teeth; flowers light yellow, keel sometimes purple tipped, 4 lines long, erect; pods erect, 4 lines long by 2 lines wide and less than 1 line thick, slightly exceeding the calyx and its lobes, hoary, the tip slightly incurved, elliptical, rounded at base and barely acute at tip, obcompressed, flattened at base, ventral suture prominent, neither suture incurved, one-celled, chartaceous; seeds several, large. The oldest leaves and stems are sometimes only pubescent.

Collected at Willow Springs and on the Moencoppa, northern Arizona, June 10, 1890.

FRASERA UTAHENSIS. Intermediate between *paniculata* and *albomarginata*. Upper stem leaves reduced to small bracts, lower opposite, 3 to 4 inches long and nearly 1 inch wide at the ovate clasping base, tapering gradually to a slender point; root leaves clustered, 1 inch wide at base and somewhat contracted and gradually tapering to a point, or lanceolate from a slightly contracted base and long acuminate, nearly 2 inches wide in this case, distinctly 3-nerved and indistinctly 7-nerved; stems 3 to 5 feet high, erect, widely branching (at right angles to the stem) toward the top, branches opposite and a foot or more long; whole plant glabrous; pedicels flexuous ½ to 1 inch long in flower and in fruit lengthening to 3 inches; all the flowers show a decided tendency to become erect by the curving of the lower pedicels; calyx lobes generally broadly ovate, acute or abruptly acuminate, whitish margined, 1½ to 2 lines long, enlarging somewhat in fruit; corolla yellowish green and purple spotted, lobes 4 lines long, oblong-obovate, obtuse, and with rather ragged margin; gland above the middle, much broader than long, with a prominent tooth in the middle, yellowish, glabrous on its face or only slightly hairy, fringed on the edge, base confluent into a pair of coronal crests which are bilamellate and dissected into flattened subulate segments which terminate in long

twisted white hairs, the lamellæ unite below into the two glabrous tubes which extend nearly to the base of the lobes; filaments purple at very base, separate, and surrounded at base by scanty hairs; style short and subulate; stigma very small; pod lanceolate or oblong-ovate, acuminate, flattened but doubly convex; seeds elongated-oblong, marginless.

Collected by me June 19, 1890, on the Buckskin Mountains (Kaiba Plateau), on the southern edge of Utah. It grows in the valleys also and in poor soil, in very dry situations. The descriptions of allied species in the Synoptical Flora are very incomplete and unsatisfactory.

CERCOCARPUS ARIZONICUS. Low, intricately branched, spinescent, 1 to 2 feet high; whole plant short-woolly except the old stems which are smooth and very light gray; leaves in fascicles of 6 to 10, narrowly oblong and entire, revolute and so broadly linear, very thick, obtuse, 3 to 6 lines long and 1 line wide or more; flowers 4 lines long and the limb 3 lines wide; seed 2 lines long, covered with very long yellowish hairs; tail 1 inch long and very long-hairy.

Collected June 11, 1890, at Willow Springs, on the cliffs.

Compared with *C. ledifolius* var. *intricatus* Jones (*C. intricatus* Watson), the flower is twice as large and the tail not much over half as long, stouter and the hairs double the length of the var. The leaves are several times thicker, shorter; the dense pubescence stands straight out from the leaf and is woolly, not at all silky nor appressed; the stems are weakly spinescent, while the var. is not at all spinescent. I have long ago shown that Watson's *C. intricatus* is only a starved form of *ledifolius*, and all sorts of transitional forms are to be found in the Wasatch. Compared with *C. breviflorus* Gray, this plant has narrow and not at all spatulate leaves, the base if anything being a little broader than the tip, leaves woolly instead of silky-puberulent, tube of the flower much longer, solitary, other differences of fruit not determinable.

CYMOPTERUS MEGACEPHALUS. Acaulescent from a thick fusiform root the top of which is shaggy with dead petioles; leaves many, flat on the ground, petioles 1 to 4 inches long (an inch or so long above the ground), leaves twice to thrice pinnatifid, triangular or ovate in outline, blade 3 to 6 inches long, segments bluntly toothed or lobed, the teeth reminding one of the lobes of some species of Cheilanthes, leaves thick, glabrous but not glaucous; pedun-

cles about as long as the leaves and not elongating in fruit, flat on the ground; flowers very small, dirty white, in dense heads like the heads of mimosa flowers, ¾ inch broad in flower and 1½ to 2 inches broad in fruit, involucre none, top of the peduncle enlarged into a disk from which the innumerable flowers arise; fruit with generally thick spongy wings, almost orbicular to obovate, truncate at the top, 4 lines long and 3 wide, wings a little over a line broad, all three equally developed, oil tubes 8 or more on the commissure, and 4 to 7 in the intervals, fruit hairy at the top, and the triangular calyx lobes green and starlike on the top of the fruit.

June 10, 1890, on the mesas just south of the Little Colorado, northern Arizona, growing in gravel. This is to be compared only with *C. globosus* and *corrugatus*, but is very different from either in the leaves and fruit as well as the size.

LAPHAMIA GILENSIS. Shrubby at base, 6 to 10 inches high, glabrous; simple, striate stems tufted and erect; leaves distant, lower opposite, long petioled, petiole margined 1 inch long; blade ¾ inch long, ovate or broadly ovate and with a cuneate base, 3-nerved from the base, small, lowest entire or coarsely dentate, or three-lobed and coarsely dentate; upper leaves much reduced, alternate, always lobed or dentate and more or less glutinous; heads single, terminating the slender branches; involucral scales ovate or lanceolate, outer ones acute, all nerved and glandular; heads many flowered; rays yellow present or absent, about ¼ longer than the disk flowers; akenes with one slender upwardly toothed bristle; hairs on the sides of the akene thick and bidentate at the tip.

May 23, 1890, at Putnam's Ranch, near the Gila River, growing among rocks. This is allied to *L. lanceolata* Gray.

ERIOGONUM FLEXUM. Annual, intricately and widely branched from the base and upwards, 1 to 2 feet high and branches a foot or more long and horizontal; leaves fleshy, yellowish-green and glabrous except a few scattered hairs and some scurf; petioles glandular and hairy, 1 inch or less long; blade nearly round, 9 lines long, obtuse, cuneate at base: stem leaves generally in threes at the nodes, linear-oblanceolate, acute, lower 6 lines long, upper gradually reduced but never minute, glabrous except at base where there is a glandular and hairy pubescence; lower part of the stem and nodes glandular and sparsely hairy, otherwise glabrous; pedicels ascending from every node of the repeatedly dichotomous branches, 1 to 2

inches long, purplish, capillary bent at right angles above the middle; scales of the involucre separate nearly to the base, lanceolate or ovate-lanceolate, obtuse, 1 line long, hyaline margined, erect; flowers 5 to 10 on pedicels ½ a line long, ovate with a contracted base and the lobes connivent at tip, 1 line long, pubescent with very stiff short hairs, but scarcely glandular, sepals 1 line long and very narrowly triangular, three times as long as wide, golden yellow, the pubescence confined to the lower half, midrib prominent. The nearest congener is *E. salsuginosum*. The flowers are much the same, but the akene of *flexum* is brown, broadly ovate, very narrowly winged at the abruptly contracted summit, not at all winged in the middle, and slightly so at the base. The akene of *E. salsuginosum* is simply ovate, and winged throughout and conspicuously so at the base and broad apex, and is yellowish brown, they are the same size. *E. flexum* resembles *E. trichopodum* in habit. *E. salsuginosum* is a small, erect, closely branched annual, with some of the upper involucres long peduncled, and the rest sessile.

Collected June 10, 1890, on the Moencoppa in northern Arizona. It grows on dry mud flats.

There are two plants which need characterizing, one of which has been known for ten years—two species of Stanleya. The first is a very conspicuous plant from the wide sandy valleys of western Nevada.

STANLEYA ELATA. 2 to 6 feet high, erect, short lived or biennial, branching toward the top, glabrous to the flowers, and often glaucous; leaves very thick and leathery, veiny, generally entire, but sometimes with a few small lobes at the base, 4 to 10 inches long, obtuse, oval or ovate generally cuneate at base and contracted into the margined petiole which is seldom over 2 inches long; upper leaves lanceolate, acute, on a half-inch petiole, entire and contracted at the base, lower leaves slightly and irregularly dentate, spikes simple or compound 1 to 2 feet long and very showy from the golden glabrous sepals which are half an inch long and enlarged into a blade 2 lines wide; petals about 4 lines long, light yellow and inconspicuous, claw broadening to the base and glabrous, blade 2 lines long and scarcely wider than the upper part of the claw, narrowly linear; stamens twice as long as the petals, anthers loosely coiled, filaments glabrous down to the middle then very woolly to the base, with short, broad and flat hairs, not enlarging much at base;

pods 3 to 4 inches long and filiform, about ½ a line wide, seeds linear. This magnificent plant is conspicuous for miles near Hawthorne, Nevada, standing up like a sentinel on the plains. It differs from *S. pinnatifida* in the large leathery leaves which are generally very broad and entire, in the broad yellow sepals, very narrow and small glabrous petals, woolly filaments, and very long and narrow pods and linear seeds.

This was first collected by me in 1882, near Hawthorne.

Stanleya pinnatifida has greenish, linear, inconspicuous sepals, golden yellow petals, with a blade about 4 lines long and lanceolate but sometimes broadly linear and sometimes elliptical, the claw is subulate and quite broad at base and very woolly throughout, the stamens are woolly on the lower half and not much enlarged at base, anthers loosely coiled, the pods are shorter and about a line wide, seeds broader. It is a perennial from a woody root, and seldom is strictly erect.

STANLEYA ALBESCENS. Biennial, erect, branching from the base, 1 to 3 feet high; leaves entire or lyrate-pinnatifid toward the base, lanceolate to ovate, upper ones hastate and with a minute pair of leaflets on the short petiole, often glaucous, thick and cabbage-like, lower ones 6 inches or less long by 2 inches or less wide, petiole 1 inch long in all but the upper leaves; spike sessile, rather dense, sepals linear and slightly widened toward the top, white with a green tip and slightly tinged with green, $\frac{3}{16}$ inch long, glabrous; petals $\frac{7}{16}$ inch long, light yellow or at first almost pure white, blade broadly oval ¼ inch long, slightly erose, obtuse and abruptly contracted into the claw which is very narrow at the top and only ½ a line wide at base, claw clabrous except the top where it is scantily woolly; stamens $\frac{5}{8}$ inch long exclusive of the tightly coiled anther, with a few woolly hairs toward the base, only very slightly enlarged at base; pods 2 inches long, a line wide; seeds narrowly oblong, obtuse; pedicel $\frac{3}{8}$ inch long and stipe ½ inch long. This differs from *S. pinnatifida* in the very narrow white sepals, broad whitish almost glabrous petals, almost glabrous filaments and tightly coiled anthers, and short pods, as well as being biennial.

June 10, 1890, on the Moencoppa in dry mud from freshets.

SALT LAKE CITY, April 9, 1891.

NEW FORMS OF AMERICAN MOLLUSCA.

BY T. D. A. COCKERELL.

PUPA ARIZONENSIS var. nov. SAXICOLA. 3 to 3¾ mm. long. Common under rocks on Round Mountain, Custer County, Colorado. Dr. V. Sterki, to whom I sent specimens, remarks, "They are a little smaller than my specimens from New Mexico, and, if I am not mistaken, a trifle more tapering towards the apex than the type specimen in the Binney and Bland collection."

PUPA OVATA forma nov. ANTIQUORUM. 2 mm. long; lamellæ 7; three on parietal wall, the central one large and slender, the others very small: two on columella, these approximately of equal size, and both rather slender: two on external wall, continued backwards, the upper one large and curved downwards about its middle. Whorls 4½, body whorl inflated, the others diminishing regularly and rather rapidly towards the apex; outer lip conspicuously curved inwards opposite the upper tooth on external wall. Post-tertiary deposit at West Cliff, Colorado. This form also occurs living, as Dr. Sterki, to whom I sent a specimen, says it "is of a form of which I have seen examples from many parts of the country, of the same size, shape, and formation of lamellæ."

BULIMULUS DORMANI forma nov. SUBFASCIATUS. 31 mm. long, very thin, semitransparent, hardly at all maculate, but fasciate with pale brown about base on body whorl, *i. e.*, an indistinct band at periphery, a broad one below, and the umbilical region brownish. This form was sent to me by Mr. W. G. Binney.

3 Fairfax Road: Bedford Park: London, W.: Eng.: Feb. 28, 1891.

CACTACEÆ OF THE CAPE REGION OF BAJA CALIFORNIA.

BY T. S. BRANDEGEE.

Cactaceæ, although numerous in the Cape Region, are not as abundant in species or individuals as in elevated regions of the central peninsula about Purisima and Comondu, but they are common enough to form a prominent portion of the vegetation.

A Mamillaria just coming into flower was found from near the ocean at San José del Cabo to the summit of the mountains of the Sierra de la Laguna. It is a nearly globular species, six to eight inches in diameter.

MAMILLARIA GOODRIDGII Scheer. is abundant at the southern extremity of the peninsula about San José del Cabo. The scarlet fruit, though small, has a pleasant acid taste.

MAMILLARIA ROSEANA. Stems numerous from the root, spreading, curved, ascending, ⅓–2 m. long, 4 cm. thick; mamillæ arranged in quincunxial order, 15 mm. apart, cylindrical, 12 mm. long, white-woolly in the upper axils; pulvinæ finely pubescent; radial spines 7–9 in number, 9–12 mm. long, brown or straw colored, the single central spine, 25 mm. long, curved, hooked at the tip; flowers from the axils of the upper mamillæ, 3 cm. long; sepals and petals bright scarlet, joined into a tube, spreading at their tips, in several series; stamens and style scarlet; style branches 5–7; fruit scarlet, pyriform 6–8 mm. long; seeds black, pitted; cotyledons united, only a depressed line at their tips; albumen none.—Throughout the lower elevations of the Cape Region and northward to Calmalli.

This cactus is one of the most showy of Lower California. Dr. Palmer collected it at La Paz and it is No. 139 of the list from that place in Contr. U. S. Herb. No. 3, catalogued by Mr. Rose for whom it is appropriately named. The stems pendent from rocks at Comondu are sometimes six feet long. This species and *M. Halei* of Magdalena and Santa Margarita Islands have similar flowers, fruit and seeds. The seeds of *M. Halei* were wrongly described as smooth; they are pitted in the same manner as those of this species.

CEREUS PECTEN-ABORIGINUM ENGELM. This giant cereus is common at San José del Cabo, La Paz, Todos Santos.

CEREUS PRINGLEI Watson is also abundant.

CEREUS STRIATUS. Stems 4-angled, becoming terete, 1 m. high, 2–6 mm. in diameter, very sparingly branched above, ash-colored, weak, 9-ribbed or striate, the ribs flat and slightly raised above the flat, greener depressions, areolæ small, about 6 mm. distant vertically, slightly lanate when young; spines about 9, soft, closely appressed, either light-colored or brown, 2 mm. long; flowers few, 10–12 cm. long, tube elongated, bearing bristles 8–9 mm. long, similar to the spines of the stem; fruit sessile, obpyriform, 2–2½ cm. in diameter, 3–4 cm. long, bright scarlet when mature and bearing the persistent spines; seeds angular black, finely pitted, embryo slightly hamate.—San José del Cabo in fruit and with remnants of dried flowers. Found also on Magdalena and Santa Margarita Islands and northward beyond San Ignacio.

This is a very peculiar species of Cereus and differs much in appearance from nearly all others of the genus. The weak stems are no thicker than straws and are supported by the bushes amongst which they grow. The ashen color of the slender plants and its habit of growing amongst bushes almost conceal it from observation, and only when in flower or when the conspicuous fruit becomes scarlet is it likely to be noticed. The ribs are flat and broad and sometimes so close that apparently only a line of lighter green separates them. The spines are soft and the whole plant can be handled with impunity. The fruit is very large for the size of the stems, insipid to the taste and consists mostly of black seeds with very little pulp. The natives call it "Pitahayita" from the general resemblance of its flowers and fruit to *C. gummosus*, called "Pitahaya."

CEREUS GUMMOSUS Engelm. This species is abundant in the Cape Region and during September can be found bearing both flowers and fruit. The fruit is sessile, globular, 6–8 cm. in diameter. The 30–40 areolæ are armed with 10 or more short stout persistent spines. When ripe the fruit is bright scarlet and is eaten by the inhabitants of the region and is well known as "pitahaya acre." Within it resembles in color the purple of a ripe watermelon with the small black seeds scattered throughout. It is prepared for eating by cutting and peeling off the outer skin and thorns. The acid taste of the fruit is agreeable, and on the plants is retained a long time but the flavor is lost soon after picking. The seeds are 2½ mm. long, rugose, pitted, embryo very much hooked.

CEREUS SCHOTTII Engelm. About Todos Santos this species runs into some very peculiar forms; the tops of the stems differing in their spines in no respect from the lower part. At first they seemed like a different species but connecting forms abound.

CEREUS THURBERI Englem. Common in the southern part of the peninsula. The fruit is made into preserves and without sugar is extremely sweet, whence the common name of the species "Pitahaya dulce."

CEREUS ERUCA Brandegee. Remains of old flowers with an abundance of ripe fruit were found on the mainland opposite Magdalina Island, and from them the following additions to the original description are made: The flowers are four or five inches long. The fruit is about two inches in diameter. Somewhat spiny,

globular, dull red when ripe, acid and pleasant to the taste. Seeds very rough, embryo slightly hooked. The fruit much resembles in form and color that of *C. gummosus*, the well known pitahaya of Lower California. It is more acid in flavor and on that account not so much esteemed. Within the color is bright purple, similar to that of a ripe watermelon. As far as known, its habitat appears to extend from San Gregorio to below Santa Margarita Island along the coast in sandy situations. It perhaps does not belong to the Cape Region flora.

A species of Echinocereus, bearing dull red flowers, is abundant at Todos Santos and La Paz. It does not grow on the peninsula north of these places.

A species of Cereus with long stems hanging from the rocks grows in the Sierra de la Laguna. The spines are few and short, the stems are prominently angled and their color light green. Neither flowers nor fruit were seen.

OPUNTIA (PLATOPUNTIA) sp. The common species of the southern part of the peninsula.

OPUNTIA PROLIFERA Engelm. San José del Cabo.

OPUNTIA ROTUNDIFOLIA. Erect, slender and weak, ramose, 2–3 m. high, supported by bushes; stems cylincrical, woody, 1–1½ cm. thick; joints 6–10 cm. long; spines none; setæ numerous, retrorsely barbed, 3–5 mm. long, usually reddish brown; pulvilli gray, woolly, remote; leaves sessile, fleshy, round-ovate, acute, 2–3 cm. long and broad; flowers about 4 cm. in diameter; sepals few, spatulate, short; petals few, yellow, broad and entire; style a little shorter than the petals, with (in the single flower) four branches; fruit slenderly clavate, about 5 cm. long, 4–6 mm. wide, with 15–20 areolæ, setæ-bearing like the joints; seeds few, flattened, whitish, densely covered with white hairs about as long as the diameter of the seed, apparently somewhat deciduous in age, commisure readily separating, embryo curved about small albumen, the thick cotyledons somewhat obliquely incumbent.—Not uncommon in the Cape Region at low elevations. At Todos Santos and La Paz in January it was in fruit and all the leaves had fallen excepting a few at the ends of young growing shoots, but in September at San José del Cabo the whole plant was covered with a mass of thick green leaves, amongst which a few yellow flowers were visible. In January the setæ were numerous and so easily detached that many fell while cutting specimens, and the inhabitants say the wind will blow

them into their eyes; being very sharp they easily enter the flesh of the hands and, retrorsely barbed, they remain there several days and are very disagreeable. The long fruit appears like a small joint. In September, with its numerous dark green leaves, it is not easily distinguished from the bushes amongst which it grows and resembles Peirescia, from which genus it is however separated by its barbed setæ, its fruit and seeds.

STRANGE NESTING PLACE OF THE BARN OWL.

BY W. OTTO EMERSON.

A neighbor informed me that a pair of barn owls (*Strix pratincola*) had taken up their abode on the tin roof around the cupola of their house, and upon visiting the place I found twenty-odd eggs which had not hatched, owing perhaps to the intense heat of the tin roof during the day or from the inability of the owl to cover so many. There was nothing used for nesting material or to prevent the eggs rolling about the smooth surface. After removing these eggs two more were laid, which in due time hatched. The two young were placed in a cage upon the lawn under a tree, and were kept well fed by the parent birds, as many as eight or ten gophers being found some mornings scattered over the lawn, and how many had been fed to the young during the night there was no means of knowing. The cage, one day, was moved to another place, and when the owls discovered the absence they made a great fuss by loud calls, screeching and by snapping their beaks. A lady went out of the house to try and stop the noise and was followed by the owls until the cage had been placed under the first tree, then they quietly departed. On September 13, when the young were about two months old, they appeared to be in perfect plumage.

THE RELATIONSHIP OF BELL'S SPARROW AND SAGE SPARROW.

BY F. O. JOHNSON.

The winter habitat of the sage sparrow (*Amphispiza belli nevadensis*) extending into the southern counties of California, affords an excellent opportunity for studying the relationship of these two forms.

In the winter of 1888–89, in the vicinity of Riverside, Cal., I gave these birds some attention.

Bell's sparrow *(Amphispiza belli)* is a resident and breeds commonly, although it is quite difficult to find their nests. I have had the fortune to find but two of them, in both cases in cañons, placed in small bushes about eight inches from the ground. The number of eggs in each instance was four.

The earliest specimen, in my collection, was taken Nov. 27, 1887.

During a fortnight's stay in Riverside, from Dec. 24, 1889, to Jan. 3, 1890, I took three Bell's sparrows and seven sage sparrows.

The difference in size of these birds is very apparent, even at good range gun-shot, both in the lighter coloration and greater size of wing and length of tail of the sage sparrow. Their actions, too, are quite different. The sage sparrows are much wilder, and never have I shot one in a cañon. Mr. Ridgway observes of these birds in breeding season that "at Carson City he found these sparrows very abundant, * * * * as it was also the most *unsuspicious and familiar*.* It was even difficult to keep them from under the feet. A pair would often run before him for a distance of several rods with their unexpanded tails elevated, and when too nearly approached would only dodge in among the bushes instead of flying off." (See Baird, Brewer & Ridgway, N. A. Birds, Vol. I., p. 595.) So in this respect their habits are apparently different in their summer and winter homes. They prefer the sage brush of the open plain, generally associating with several others and often going in scattered flocks.

Bell's sparrow freely mingles with them, but the collector after some experience has but little trouble in discriminating between them. The sage sparrow is much more terrestrial than Bell's, often running along the ground in cases where Bell's would fly, and holding their black tails high in air, then mounting to the top of a sage bush till you get nearly in gun-shot they will drop down on the other side and make for the next bush as fast as their little legs can carry them, in the manner of a California thrasher *(Harporhynchus redivivus)*. Often one can get a cross fire on the bird as he runs from bush to bush.

Last January I was again at Riverside for a week, and riding out on the plains towards the hills, I saw more than I had ever noticed before, both in large flocks and individually. Indeed, I saw one flock with over a hundred in it. How I did long for a gun!

*Italics my own.

I do not remember of hearing their song at all.

They certainly have an aversion to the haunts of man, as I have never seen either form around civilization or cultivated fields.

Out of nine specimens collected by me but two are females.

It should be borne in mind that the differences between Riverside specimens of the two forms is based on fall and winter birds only.

I have observed the following general differences between the two forms:

AMPHISPIZA BELLI.	AMPHISPIZA BELLI NEVADENSIS.
Little or no traces of dorsal streaks.	Dorsal streaks always present, generally well defined.
Above, hair brown, darker on head; mandibles slate black.	Top of head, general color of black, and often under mandible much lighter.
Outer web of outer retrix same as inner web, or but little lighter.	Outer web of outer retrix whitish, sometimes broadly tipped with white.
Outer edging of primaries light brownish.	Outer edging of primaries plainer and whitish.
Edging of secondaries and tertials dull light cinnamon.	Edging of secondaries and tertials much lighter.
Flanks washed with light cinnamon, streaked with dusky.	Flanks lighter, less streaked.
Stripes on side of throat always well defined and constant.	Stripes on side of throat not well defined, often only obscure traces present.
Pectoral spot always distinct.	Pectoral spot more diffused, sometimes nearly lacking.

Scarcely any of the specimens carry all of the above distinctions entirely, but usually vary in regard to some one particular; so that while none of the differences between the two forms seem altogether constant, not one of my birds, nor indeed of any others I have examined, appear to lean towards the other variety very decidedly, nor is there any hesitation of instantly assigning any specimen to its proper form. Moreover, the subjoined table of measurements show that in size they are also quite constant. On account of the lack of females I cannot actually give their differences in size, but have merely inserted their measurements with the males; all of them were collected by myself at Riverside, Cal.

AMPHISPIZA BELLI.

Collector's No.	Sex.	Date.	Wing.	Tail.	Bill from nostril.
			mm.	mm.	mm.
	♂	September 20, 1887.....	65	67	7.5
325	♂	January 2, 1889.....	65	69	7
507	♂	April 7, 1889.....	67	67	7.5
315	♂	December 31, 1888	72	71	7
		Average.....	67.2	68.5	7.2
845	♀	December 26, 1889.....	62	64	6

AMPHISPIZA BELLI NEVADENSIS.

Collector's No.	Sex.	Date.	Wing.	Tail.	Bill from nostril.
			mm.	mm.	mm.
	♂	November 27, 1887.....	79	74	7.5
296	♂	December 24, 1888.....	77	71	7.5
327	♂	January 2, 1889	77.5	75	8
297	♂	December 24, 1889.....	79	72.5	8
849	♂	December 26, 1889.....	76	71	7.5
850	♂	" "	75.5	68.5	8
858	♂	" "	78	72	8.5
		Average.....	77.5	72	7.8
847	♀	December 26, 1889.....	70.5	68	7
859	♀	December 31, 1889	72.5	70	8
		Average.....	71.5	69	7.5

The most striking difference in size of the two forms is in the greater size of the wing of the sage sparrow, a little more than ten millimetres. The differences of tail and bill are not so marked, being three and one-half millimetres for the tail and about three-fifths millimetres between the bills.

Therefore, judging from the small winter series available, there seems to be pretty plain evidence of specific difference, but in such cases one needs a large series at hand for forming an accurate decision.

NOTES ON THE NATURALIZED PLANTS OF SOUTHERN CALIFORNIA. VIII.

BY S. B. PARISH.

Arundo donax holds a somewhat uncertain place in the American flora. A native of Southern Europe, it may be reasonably thought to have reached us from that source. Yet along the banks of the Rio Grande River it is found apparently indigenous.* It is not uncommon in northern Mexico, and recently Mr. Brandegee has col ected it in Lower California. And now Mr. Lyon sends it from Los Angeles, where he reports it as growing in great abundance in the river bed, and often springing up in gardens from seed brought down through the city water pipes. It has been long established by the river side, Mr. Lyon's own knowledge of it going back nineteen years, while he learns from others that it was equally abundant forty and fifty years ago. An aged native Californian states that more than seventy years ago his father was accustomed to have his Indian peons gather it for building their jacales or huts, considering it more durable for this purpose than tule (*Scirpus lacustris*), which was also sometimes used.

It is remarkable that this conspicuous reed, growing in the very outskirts of one of the oldest towns of the State, should have so long escaped the notice of botanists, and if it is indeed indigenous Mr. Lyon's station is not likely to be the only one. The Spanish-speaking people call it carrizo, a name borne by more than one stream of the desert region; but the presence of Arundo by their banks is not to be therefore inferred, since the same Spanish term is applied to *Phragmites communis*, and perhaps to any reed-like grass.

The history and manner of growth of this reed at Los Angeles are such as to render its exotic origin somewhat doubtful, and it would be much more so if it be truly indigenous on the Rio Grande,

*Vasey, Agric. Grasses of U. S., 2d Ed., 60. Coulter, Contrib. U. S. Nat. Herb., ii, 58.

and should it be discovered at intermediate points. But considering the uncertainty of its character elsewhere, and the isolation of the Los Angeles station, it will be most properly, for the present, regarded as an introduced plant.*

Brassica alba I have received from Dr. H. E. Hasse, who finds it not uncommon about Santa Monica. He also reports *Solanum rostratum* at the same place, but not abundant. This is the second station in Los Angeles, and in the State, for this pest, and marks its gradual increase.

Dr. Hasse also discovered near Santa Monica a single plant of *Phytolacca decandra*, the common poke of the Eastern States. As it was loaded with ripe fruit it is probable that this species will be permanently added to our flora. This find is a most interesting one, the plant not having been found heretofore west of the Rocky Mountains.

Senecio sylvaticus has been collected by Mr. Cleveland along the water front at San Diego, and *Raphanus Raphanistrum* in plowed fields at many places near the same city. *Convolvulus pentapetaloides* he finds abundant along and near a stony road in the Sweetwater Valley, ten miles from San Diego.

Another species of the last mentioned genus, *C. arvensis*, is well established by the roadside near Seventh and A streets in San Bernardino. In the environs of the same city *Scabiosa atropurpurea* is quite common in damp adobe soil. In some of the suburbs, as at St. Elmo, it is very abundant by roadsides and in fields. It has been reported in a recent number of this journal from Pescadero and the San Joaquin River.†

In a meadow at St. Elmo I also saw this summer some two or three dozen plants of *Daucus carota*, the wild carrot, so common and obnoxious in the Eastern States. They were seeding plentifully, and in all probability will produce a progeny which in time

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*In the third Report of the State Board of Forestry, page 46, this reed (there called by mistake *Arundinaria macrosperma*) is said to be "abundant along many water-courses in the State, being most prolific along the water-ways of the older towns and cities." Los Angeles and San Bernardino are specified as places where it is especially plentiful. This statement is misleading, and is entirely unsubstantiated as to any other places than Los Angeles. It certainly is an error as to San Bernardino.

†Zoe, i, 86.

will be very troublesome. This is the first recorded appearance of this plague in California, although it is probably to be found in other parts of the State.

Observing the beginnings of such evils one is impressed by the ease with which their spread might be prevented by prompt action. But this is taken with neither vegetable nor animal pests. Indeed their character is not at first realized, and it is only after their ravages become disastrous that efforts, always costly and too often ineffectual, are made for their extermination. Much of this might be prevented by an intelligent supervision which would detect and stamp out these plagues before they had time to spread; but it is doubtful if such a supervision could be provided or successfully exercised.

The garden dill, *Peucedanum graveolens* B. & H.,* the appearance of which as an escape at Los Angeles has already been recorded in these notes,† I have observed during the past summer in great abundance by roadsides and in fields in some of the environs of San Bernardino, so that it may be regarded as fully established. *Mentha piperita* also grows abundantly by the banks of several streams in the city limits of the same town.

Sisymbrium acutangulum is reported in the Botany of California to be found about the "older towns from San Francisco to Los Angeles." The southern range, I am informed by Dr. Watson, rests on specimens collected in 1860–62 by Brewer, "back of Santa Barbara and Los Angeles." Later collectors have not found it, nor is it known to resident botanists of either place as now growing at them. It is therefore doubtful if it is at present an inhabitant of our region.

Veronica peregrina exhibits here the same dubious character that it possesses in most places where it is found in the United States. It is not uncommon in neglected fields, and is occasionally seen by roadsides, but I have yet to meet with it at a distance from cultivation.

ESCAPES AND WAIFS.—Many of the plants cultivated in field or garden are occasionally to be found growing spontaneously, and some have been included in floras. Such are lucerne, the garden

*Coulter & Rose, Bot. Gaz., xiv, 275. *Anethum graveolens*, L.

†Zoe, i, 10.

radish and the tomato, and among flowers the sweet alyssum. In this region they are mere temporary fugitives which fail to propagate and extend themselves, and have no claim to be enumerated among our plants. *Ailantus glandulosus*, the garden asparagus, and the common pampas grass show some inclination about San Bernardino to pass into the rank of truly naturalized plants, and other similar instances have been mentioned elsewhere in these notes. Mr. Cleveland reports *Cerastium viscosum* in a yard at San Diego, and *Melilotus alba* in a cultivated field at Buckman's Spring, near Pine Valley, San Diego County, both apparently not fully established. Probably here also belongs *Carex pseudocyperus* var. *Americanus*, a single plant of which I collected ten years ago by the roadside in San Bernardino. It has never reappeared, and is not otherwise known south of San Francisco.

SUMMARY. Excluding those plants whose foreign derivation is disputed, and those which have not sufficiently established themselves, the naturalized flora of the four southern counties comprises the following species:

Brassica *nigra*.
alba.
campestris.
adpressa.
Nasturtium officinale.
Capsella Bursa-pastoris.
Raphanus Raphanistrum.
Cerastium viscosum.
Stellaria media.
Portulaca oleracea.
Malva parviflora.*
Erodium moschatum.
cicutarium.
Melilotus Indica.
alba.
Convolvulus arvensis.
Solanum rostratum.
Physalis *æquata*.
Nicotiana glauca.
Verbascum virgatum.
Verbena officinalis.
Mentha piperita.
viridis.
Nepeta cataria.
Marrubium vulgare.
Plantago *major*.
lanceolata.
Rumex crispus.
conglomeratus.
Polygonum aviculare.†

*To this species, rather than to *M. borealis*, belongs the common Mallow of Southern California.

†*Polygonum nodosum* was included on a previous page, but while usually a weed of cultivation it may possibly be also indigenous, and is therefore omitted.

Medicago denticulata.
Pastinaca sativa.
Peucedanum graveolens.
Dipsacus fullonum.
Scabiosa atropurpurea.
Melampodium perfoliatum.
Xanthium *Canadense.*
spinosum.
Verbesina encelioides.
Bidens pilosa.
Anthemis Cotula.
Cotula *coronopifolia.*
australis.
Senecio sylvaticus.
Cnicus edulis.
Silybum Marianum.
Centaurea solstitialis.
melitensis.
Sonchus *oleraceus.*
asper.
tenerrimus.
Anagallis arvensis.
Ipomæa *purpurea.*
Convolvulus pentapetaloides.
Amarantus *retroflexus.*
chlorostachys.
albus.
Chenpodium murale.
ambrosioides.
Urtica urens.
Ricinus communis.
Sagittaria Chinensis.
Panicum sanguinale.
Crus-galli.
Phalaris Canariensis.
Polypogon Monspeliensis.
Cynodon Dactylon.
Avena fatua.
Lamarkia aurea.
Arundo Donax.
Poa annua.
Eragrostis pilosa.
Festuca Myurus.
Bromus maximus.
rubens.
Lolium temulentum.
Hordeum murinum.
Sorghum halepense.

There are in the above list 78 species, belonging to 59 genera, and representing 23 natural orders, the most numerous being the Compositæ and the Gramineæ with 16 species each, and next the Cruciferæ with 7 species.

The species are not unequally divided between those which are widely diffused and numerically abundant, of which there are 43, and those which are more or less restricted in habitat, of which there are 35 species. In the table the former are printed in Italic, and the latter in Roman type.

In Brewer and Watson's Botany of California 46 of these species are reported as growing in the southern part of the State, and nine others at stations north of our limits, so that twenty-three species remain whose presence in California was not known at the time that work was published. A few of these certainly were growing here at that time, but by far the greater number, probably nearly

twenty of them, have either come to us, or have passed from the condition of mere adventive plants to that of naturalized ones, in the period of twelve or fifteen years that have elapsed since the material was accumulated on which that great work was founded. That nearly one-quarter of the naturalized flora of the region should have been added in this short time is a notable fact, but quite in harmony with the great increase of population and the wonderful industrial development during the same period.

Sixty-two species of the entire seventy-eight, including all the Cruciferæ and all but one of the grasses, are of European origin, and the same proportion holds if the commoner plants only are considered. Fourteen are natives of other parts of America, twelve of them coming from the South and two from the North, a preponderance agreeing with the derivation of the native flora. Asia and Africa supply two species each, and Australia one.

This statement, however, does not correctly represent the immediate sources from which most of these plants have been received. Many of them have long been dispersed from their primitive homes, and are weeds of world-wide diffusion. These are for the most part attributed to Europe, although the real nativity of some of them is very uncertain, and they have doubtless reached us through intermediate countries. It is probable that the only direct importations are those few plants which are not likewise naturalized either in Mexico or in the transmontane States of the Union, the former being the intermediary through which the earlier introduced and more abundant species have been received, while more recent emigrants have come by way of the latter.

The four counties here, called Southern California, constitute one-fifth of the entire area of the State; a territory a little larger than Ohio. But of this great province only one-tenth is arable land, a district hardly more than half the size of New Jersey.*

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*AREA OF SOUTHERN CALIFORNIA.

	Arable. sq. m.	Mt. and Desert. sq. m.	Total sq. m.
San Diego.....	836	14,133	14,969
Orange	450	304	754
Los Angeles.....	1,000	2,996	3,996
San Bernardino.....	2,000	19,170	21,170
	4,286	36,603	40,889

The arable parts of Los Angeles and San Bernardino are estimated.

This smaller portion contains the farms, the towns and almost all the population, and in its limits are found also most of the naturalized plants. The other region consists of deserts or rough mountains, the former largely preponderating. Its population is sparse, and there is comparatively little travel and few roads. The opportunities for the introduction and dissemination of foreign plants are consequently slight, and as there is almost no agriculture the weeds of cultivation are seldom seen. The climate of the desert is an additional safeguard to the integrity of its vegetation. Few exotic plants are capable of adapting themselves to the aridity of air and soil which there prevail. Hence, the desert flora is but slightly contaminated by intruding species, and these are easily recognized, since they cling closely about houses or camping places. A few early introduced plants, such as the Erodiums, have a somewhat wider range, but in no degree comparable to their abundance in the inhabited districts. So little is this region receptive of new comers that the prevalence there of any plant away from habitations and routes of travel is almost conclusive evidence of its indigenuous character. With our present imperfect knowledge it is not possible to give the number of introduced species which extend to the desert region, but they are probably not more than twenty. Numerically they constitute a very small proportion of the whole vegetation, and in the mountain districts it is hardly greater.

Very different is the case in the region of fertility. Here introduced plants constitute a very considerable element of the vegetive life. These have not, indeed, supplanted the natives to such an extent as is unhappily the case in the Atlantic States, where the European visitor finds the agrestial and ruderal vegetation largely made up of the weeds of his own fields and waysides. Our meadows are yellow with native buttercups, azure with Brodiæas, or whitened with Yerba Mansa. By the highway the sunflower and the tarweed maintain their ground against all intruders. On the hills and plains the foreign Erodiums, bur clover and wild oat are ever present and often cover mile on mile of land, but they do not exclude the natives of the soil, and in the spring there are burnished acres of Eschscholtzia and glowing leagues of Baeria. Even in cultivated fields there are weeds of native origin quite able to compete with their foreign rivals. The black mustard alone succeeds in excluding all other plants from the soil it occupies.

While, therefore, the floral aspect of this region is strongly tinged by foreign admixture, it is predominately indigenous except in the immediate precincts of habitation. How long it may so continue cannot be foretold. Some evil emigrants are rapidly spreading, and new ones are constantly arriving.

The prevalence of intruding plants upon the other side of the continent has been explained as resulting from the originally sylvan character of that region. The native herbs were adapted to the shade of woodlands and could not survive the clearing of the forests. Thus there being no native campestrine vegetation to occupy the clearings, a free field was left for the incoming weeds of Europe.*

If it be, indeed, not by reason of any superior inherent vigor or capability of adaptation, but from the lack of suitable competition that intruding weeds obtain possession of the soil, our native flora should be able to maintain its predominance. This has never been a forest region, and possesses a large number of campestrine plants. These native herbs are likewise adapted to the condition of scanty and uncertain rainfall which here prevails. With the first showers they spring up and are in flower almost as soon as they are out of the ground, so that the production of seed is assured in the dryest season. With a continuance of moisture, growth continues and constant blossoming, until the full grown plant can hardly be recognized as identical with the pigmies which first appear. This character exercises its protective influence especially in the deserts, and among the plants of the fertile region is most developed in those which grow on dry and barren soils. In such tracts the proportion of introduced plants to indigenous ones is much smaller, not only numerically but particularly in the number of species, than it is in rich and moist places. And those exotics which are widest spread and most abundant are precisely the ones which possess this characteristic, as is noticeable in the Erodiums, the most abundant of all. Many of the most objectionable weeds require a long season of moisture to perfect their fruit, and climatic conditions may be expected to confine these to meadows or irrigated fields. Elsewhere the native herbs should have no difficulty in maintaining their possession of the soil.

CORRECTIONS.—The Cenchrus mentioned in vol. i, page 187, as *C.*

*Gray, Characteristics of the N. Am. Flora; Am. Jour. Sci. xxviii, 324.

echinatus proves to be *C. tribuloides*, a commoner but hardly less obnoxious species. *Petunia parviflora* extends considerably further north than is indicated on page 302, or in the Floras. There are specimens in the Herbarium of the California Academy of Sciences, collected twenty years ago at Oakland by Kellogg and Bolander, as well as many others from Santa Barbara up. It has also been collected at Sacramento by Prof. Greene.

ERRATA.—Page 7, for "every collection" read "early collections"; p. 8, for "Foreign Plants" read "Forage Plants"; p. 57, for "series" read "species"; p. 122, for "Warren" read "Waren"; p. 124, for "horned" read "horrid"; p. 205, line 6, for "same" read "some"; p. 206, for "accidental" read "occidental."

ANDREW JACKSON GRAYSON.

BY WALTER E. BRYANT.

Between the years 1846 and 1869 there dwelt upon the Pacific Coast a naturalist and artist of so great attainment that he became rightly known as the "Audubon of the Pacific." Under congenial conditions in this State the latent genius, which had been suppressed in childhood, burst forth in beautiful masterpieces of pen and brush and found its highest development amidst domestic happiness under the tropical sun of western Mexico. During the few years allotted for him to pursue the cherished plans of his life, he built for himself a lasting monument more exquisite than pen can describe, more wonderful than this country has known since the days of Audubon and grander than any that sculptor could have chiseled to be unveiled by appreciative friends and scientists.

It has been my privilege to study and admire the many water-colored plates of birds made by Colonel A. J. Grayson and to be called upon to edit the unpublished manuscripts in the possession of his life-partner and helpmeet, now the wife of Dr. G. B. Crane of St. Helena, California; to briefly sketch the life and scientific career—for much has already been published—and to present to the present generation an account of the most illustrious ornithologist who has lived amongst us.

Grayson has been too little known, or what is more deplorable, sometimes wrongly known. Errors and misinformation have ap-

peared in print which the present article will strive to correct and right.

Of Grayson as a naturalist, alone this memoir can treat; of the Grayson family as pioneers of California, a volume remains for a more able pen than mine, and the publisher of his portfolio will receive the esteem of the public and honor from ornithologists.

In the northwestern corner of Louisiana, at the Grayson plantation, on the banks of the picturesque Ouachita River which takes its rise in the Ozark Mountains and confluences with the Red River just before the latter enters the Mississippi, Andrew J. Grayson was born August 20, 1819. (Audubon was born in the same State in 1780.) There were but few habitations in those days upon the narrow strip of arable land bordering the Ouachita, hemmed in by pine forests and cane brakes. This strip was mostly devoted to the cultivation of cotton. The adjoining region was one of bayous, stagnant lakes and cypress swamps, the home of the alligator, mosquito and fever. There was but little society and no schools nor churches.

With such surroundings of nature in her wildest aspect it is not strange that the youthful Grayson, being of a contemplative mind, should have become one of her ardent devotees. Subject to frequent attacks of chills and fever, he was permitted by his parents to occupy his time pretty much as he pleased. With no congenial companions around him, boy-like, he spent most of his time rambling in the woods with his gun, or on the banks of the river with his fishing rod. His gun was seldom used except for game, his early love for birds was of that remarkably tender nature which spared them from ruthless destruction, and in all his after life this humane trait was evidenced.

The region gradually becoming settled and cleared along the river banks a log schoolhouse was built, where some twenty children, including young Grayson, attended under an Irish school master; but within six months intemperance caused the teacher's dismissal and another one, who proved to have his predecessor's failing, then taught for a few months.

One of the first turning points in Grayson's life came when the third instructor was engaged; he was an Irishman, by the name of Tobin, of most unprepossessing appearance who boarded at the house of Grayson's father. It was sometime during the first

year of his tuition under Tobin that he showed the beginning of the taste for drawing, his first attempts being mainly birds, foliage and flowers. The first drawing of a bird which he completed was of the wood duck *(Aix sponsa)*, and was considered by himself and the other boys a very pretty picture. One day during school hours, when Tobin was drowsy in his chair, Grayson was engaged upon a picturesque river scene; so intent was he, and the two boys peeping over his shoulders watching the progress of the picture, that they did not notice the sly approach of Tobin who suddenly stood beside them. The picture was immediately hidden in the desk, but it was too late. Tobin ordered not only that picture but the entire contents of the desk produced for his inspection and the quick refusal was followed by a severe blow upon the side of young Grayson's head. Thoughtless of the consequences, he broke his slate over the teacher's head and taking to his heels ran for home. That evening, in the presence of the boy and his father, Tobin displayed the pictures upon which he said the son was wasting his time in school. His father scanned the pictures, then threw them into the fire and followed the act by a severe scolding about the making of pictures and the wasting of opportunities. Thus in one hour was crushed (as he thought forever) the talent which he himself has said "had it been fostered might have made me an artist of no mean order."

The fracas with old Tobin resulted in his father's sending him at once to the College of St. Mary, Missouri. But during this course he was prohibited from taking drawing lessons, and as it was against his father's wishes, he did not desire to.

A year after Mr. Grayson returned from college, his father died, and the estate being divided, three negroes fell to his share; these were sold to a relative for their valuation. For the first time he commenced business on his own account. Starting a country store in the very rough and new town of Columbia, on the pine-hill side of the river, he invested his entire inheritance in the establishment. It was the only store in the town of Columbia, but most of the time the business was left to the care of a clerk whilst the young proprietor wandered about the woods with his gun. The result was what might have been expected. Mr. Grayson had no business tact whatever, no love for the drudgery of mercantile pursuits and no pleasure but in the study of nature. In two years

the store was closed. Now that we have passed the second turning point in his life, let us carefully consider the third and greatest one. It was the old, old story; Grayson met and fell in love with Miss Frances J. Timmons. "In proposing to me," says she, "Mr. Grayson told me of his future plans; that it was his intention to leave forever the country of his nativity, and endeavor to cross the Rocky Mountains and dwell upon the far off Pacific shores—in California—which was then a *terra incognita* to most of the world and especially to the denizens of the Ouachita region; such a region they had never heard of; I only knew it from my geography." They were married July 21, 1842.

While in St. Louis, Grayson had learned a great deal about this remote region from the trappers of the American Fur Company, some of whom were his old schoolmates. They gave such glowing descriptions of the beautiful land of California and Oregon; of the fine climate and abundance of game, that his spirits were filled with a desire to come and live here. Having become familiar with the fauna and flora of his own State—few knew the forest better than he—his zealous nature yearned for a new field for activity; he longed for new objects of study in nature's yet unexplored recesses.

In the year 1844 Mr. Grayson and wife moved to St. Louis for the purpose of making preparations for the long journey across the plains.

In the *St. Louis Reveille* of February 20, 1846, appeared the following notices:

HO FOR CALIFORNIA!

At the suggestion and desire of a number of my friends, who propose emigrating with me to California, and deeming it actually necessary that some one should take the lead, whereby we may be able to organize an expedition and preserve good order while on the route, I have consented to take the charge upon myself, and pledge my life to the safe conduct of those who are disposed to join us in our journey to that country. Should any one of the company, however, be considered more efficient than myself, by a majority at the *rendezvous*, I shall be most happy to resign him the duties of the command.

As it is my intention to take my family with me, which is quite young, I sincerely hope that we may have an orderly and well organized company. Those who design going should be at Independence, on the Missouri river, by the 15th of April next, as that will be the time of our departure from that place.

Emigrants should be well provided with arms and ammunition, good teams of mules or oxen, and provisions for at least six months. It is better not to be burdened with any heavy and unnecessary articles of house furniture, but good assort-

ments of farming implements, useful tools, garden seeds, and such things only as will be serviceable in a new country, and not easily to be had in California.

A good interpreter and pilot will be wanted for the expedition.

[Signed.] A. J. GRAYSON.

EXPEDITION TO CALIFORNIA.

We refer our readers to the announcement, in another column, of a proposed expedition to California. Mr. A. J. Grayson, an esteemed friend, will take charge of the emigration, subject to the pleasure of the company when it shall have assembled at Independence, previous to its departure. He is eminently qualified for such a responsible station, being a young man of enterprise, courage and determination—one who has not been accustomed to the "soft lap of luxury," but who has rather courted, from his youth up, the excitement and dangers of an adventurous life in the extensive wilds of the Southwest—a gentleman whose rifle is as true to its aim as his heart is true to the principles of honor.

Under Mr. Grayson's advice and direction we look for the organization of a numerous and highly respectable expedition to California.

This memorable expedition is best told in the words of Mrs. Grayson-Crane: "By some, Mr. Grayson was looked upon as crazy and heartless for attempting such a dangerous adventure with a young wife and child; a wife, too, who had been unused to the hardships such a trip would devolve upon her; but I was as full of romantic adventure as my husband, and could not be persuaded from accompanying him; and I may say here that the trip across the plains was one of the most enjoyable episodes of my life.

Encouraged by warm friends in St. Louis and having the good fortune to become associated with Ex-Governor Boggs of Missouri and Captain Isaac Branham with their families and others, with both of which parties the lamented Donner party became united, we felt ourselves sufficiently formidable to be in no fear of molestation or danger from savages, and it was but natural to feel that the guardian spirit of that prince of pioneers and backwoods adventurer, Daniel Boone, would be with us from the fact of the Governor's most estimable wife being his grand-daughter.

The Donner party left us at Fort Bridger, and this error gives to California the most melancholy chapter in its history.

About the middle of April, 1846, the caravan started on the long journey to the Pacific shores. Several encounters were had with the Indians; in an engagement one of the emigrants was killed, three badly wounded and others slightly. Having lost half of his team animals, Mr. Grayson exchanged the other for a horse, on which he placed his wife and child, with necessary accoutrements,

and completed the last of the way over the mountains by themselves.''

After six months constant traveling, the Grayson family reached the Sierra Nevada. Every step of the journey had been pleasant to Mr. Grayson, who had often wandered miles from the train on hunting excursions, observing birds.

That October time in 1846, when they first stood upon the heights of the Sierra Nevada at a point overlooking the magnificent Sacramento Valley, has been perpetuated upon canvas by William S. Jewett (1850). The painting is about 5 x 6 feet and cost Mr. Grayson two thousand dollars in addition to the artist's expenses in visiting the scene.

Immediately upon his arrival in California Mr. Grayson, leaving his family at Sonoma, volunteered his services in defense of the State. Every American was needed then, and Grayson, raising a company of mounted riflemen, joined the regular forces and remained on duty until peace was restored.

At the beginning of the gold excitement, he went, like almost every one else, to the "diggings,'' and was so far successful as to be considered one of the wealthy men of San Francisco.

Making one more attempt at a mercantile pursuit, he became a member of the firm of Grayson, Guildo & Lightner, on Sansome street; disappointment, reverses and fire came and came again, till he renounced the business and adopted the life of a trapper, which afforded him opportunities for the study of ornithology.

In January, 1850, Grayson surveyed and laid out the town of Grayson (afterwards named for him), on the west bank of the San Joaquin River, in Stanislaus county.

In 1852 he made a visit East and to his native home on the Ouachita, but he found everything so gloomy there in that out-of-the-way place that his greatest desire was to return to California. Once more in San Francisco (1853), he met an old acquaintance and accepted an invitation to go to the plains of Tulare County on a surveying expedition.

While he was absent Mrs. Grayson and some friends visited the Mercantile Library to examine for the first time the magnificent work of Audubon, the "Birds of America.'' Her first thought was of her husband, and as soon as he returned they went together and spent nearly an entire day over one copy. Mr. Grayson was en-

chanted. His early love of birds and his first attempts to draw them came crowding before his memory. Then he bitterly regretted that he had not been permitted to learn to draw when young, that he too might create such a work. That eventful day decided his life and turned it into its proper channel. He at once made up his mind to accomplish a similar work and call it the "Birds of the Pacific Slope," and if necessary devote the balance of his life to the task. Once his ambition had been crushed by a heartless schoolmaster, now there was no one to prevent him, and there was one to whose interest in his plans and encouragement of the first attempts made possible the achievement which places him to-day second only with the artist-ornithologists of the country. He caught the spirit of the study as others except the gifted Audubon, have not done. He went to work at once to learn to draw from nature and to color. His friends were surprised at the progress which he made and could not be convinced that he was but self-taught.

After a short residence in Marin County, he decided that he would be more happy at San Jose, and accordingly purchased a piece of land, unimproved, upon which he built his "Bird's Nest Cottage," as he and his wife named their home. Fruit trees and vines were planted and in this pleasant home he continued the practice of drawing.

In 1855 his wife and a lady friend sent, without his knowledge, some of his paintings to the State Fair at Sacramento, where they were awarded a special premium, a silver cup, upon which was inscribed:

"Awarded to A. J. GRAYSON, ESQ., for Superior Drawings of the Native Birds of California, Exhibited at the Fair, 1855."

Surprised and greatly encouraged he went to work with renewed zeal, and the following year received first premium for water colors at the fair in San Jose. However well his drawings pleased the less critical observers, they were far from reaching his own idea of the perfection for which he strived.

A short residence was made, in the spring of 1859, in Napa Valley, from whence came most of his notes and drawings of California birds, and where the famous drawing of mountain quail which has since been lithographed, life size was made.

Mr. Grayson and wife sailed for Tehuantepec in 1857. It was his intention to make Tehuantepec the most southern point for his pro-

posed work upon the birds of western Mexico. Their son Edward had been sent East to school the same year.

The voyage to Mexico ended in disaster; the schooner *Mary Taylor* was wrecked in the bay of Ventosa and all the books, drawings, drawing paper and colors were ruined. In a strange land without money, Grayson gladly accepted a position as surveyor, which enabled him to replenish his funds.

The loss of the drawing materials was keenly felt, but having become a self-taught taxidermist, he made collections of birds and kept notes and descriptions for future use.

On again arriving in San Francisco he was compelled by want of funds to sell his collections to a naturalist. They were taken by the purchaser to New York and some or all found their way to the Smithsonian Institution.

Soon after his return he made an exploring trip down the coast of Mexico in company with his esteemed friend Hutchings, of Yosemite Valley fame. Several months were spent together traveling in a canoe below San Blas.

The lateness of the season and the inclement climate brought on an attack of the coast fever, which ended the trip without having accomplished much in the way of collecting natural history specimens.

The information gained by the canoe voyage decided Grayson to settle at Mazatlan with his family and to make that city his headquarters for future explorations of western Mexico whenever opportunities afforded or time could be spared from the general merchandise and commission business in which he engaged.

During the ten years of his residence in Mazatlan he performed the work by which naturalists shall judge him. In addition to the vicinity of Mazatlan, he explored the Tres Marias Islands, Socorro Island and Isabel Islands. Grayson contributed many articles to newspapers in Mexico and California and to magazines in this State. Some of his writings appeared with his own name and many with the *nom de plume* "Wanderer," others were signed "Rambler" or "Occidentalus." The majority of the articles were geographical accounts of the interesting places and islands visited with profuse notices of natural history objects. A long letter written at Mazatlan in 1865, to the editor of the *Mexican Times*, called the attention of the Imperial Government to the wrongs of American settlers from California living upon the west coast of Mexico.

Correspondence was carried on with Mr. John Xantus while the latter was stationed at Cape St. Lucas by the U. S. Coast Survey, and the account of Xantus's accumulations interested and stimulated Grayson to keep on with his collecting. In one letter Xantus writes: "I collected 39 species of mammals, 188 of birds [nearly 3,000 specimens, elsewhere stated], 51 reptiles, 73 saurians, 927 fishes, 4,088 crustacea and about 14,000 species of insects. Besides, about 4 tons of minerals and near 2 tons of dried plants [!]. The shells amount to about 23,000." An offer of an exchange of birds' skins was made by Xantus and accepted by Grayson, but probably never carried out.

His principal correspondence was with Prof. Spencer F. Baird, then assistant secretary of the Smithsonian Institution, and from whom he received great encouragement as well as suggestions and kindly criticism.

One of these letters may be introduced here, giving as it does a clearer insight of the life and sentiment of this self-taught ornithologist.

The letter was written during the time of the French invasion of Mexico, and just previous to the overthrow of the Imperial Government, when Maximilian was betrayed, captured and shot while the civilized world stood aghast and shivering at the spectacle.

MAZATLAN, July 11th, 1866.

MY DEAR PROF. BAIRD—Once more I have returned to this part of Mexico, where I have spent so many venturous years interesting to me in my "labor of love," sometimes at the mercy of the waves in a mere canoe, at other times floating in the quiet *estero* amid the surroundings of thick and tangled mangroves or climbing the mountains of overgrown brambles and forests of high tropical vegetation, infested by ticks and other insects, but this was pleasure. But how changed this place since my absence of eight months; we had trouble enough on our long and tedious road to and from the City of Mexico, but on reaching our old home in this place we are still amid trouble and annoyances, if not really in danger, caused by the trouble existing between the two opposing parties, which has so completely unsettled the country as to prohibit any traveling in the interior. I am not permitted to have a gun of any kind, nor to go outside the city limits; and at this season of the year, too, when I so much desire to do so in order to procure the eggs of some birds and the birds also. These are the difficulties, among many others, which a poor field-naturalist or collector, like myself, has to contend with in an unsettled, savage country like this, where every tree has its thorns, every insect its sting, and every Mexican his sharp-pointed knife to assassinate or rob you upon the highway in open day, or stealthily in the night; besides this, there is the pecuniary expense to contend with, which is this country is an absolute necessity.

And what is worse still, since the French have occupied the country business has been destroyed. Indeed, since my return I have had the blues most terribly—a malady I am not often afflicted with, because I could always find "a pleasure in the pathless woods." But I will no longer trouble you with my sorryful complainings. There is some consolation, however, in writing to an old friend like yourself (for I feel towards you as though we had known each other from childhood). But to business. On my arrival I found your welcome and interesting letter of Nov. 15th, the first and only one received from you since my departure from Tepic for Mexico. It was highly satisfactory and gave me much pleasure to know of the safe arrival of the small collection of Socorro and Tres Marias birds, which I feared were lost. How I should liked to have visited these islands again this season, prepared to make a thorough investigation of them before I quit them; but this trip to Mexico has completely used me up pecuniarily, having been cleaned out most effectually by the miserable *ladrones*, both going and coming. But amid all these troubles I managed to save my portfolio of drawings unharmed, and this, much to my wonder, when we consider the ignorance of these barbarous and uncivilized thieves, who either take or destroy everything in their power, whether of any value to them or not. It seems as though a Divine Providence protected my portfolio and also my book of notes, which I left in Guadalajara, reluctantly, because the trunk in which it was, was too heavy to go in the coach; the loss of this, you know, would have been irreparable. My gun, however, my old and tried friend that has been my constant companion for years, was forced from me by the overpowering, half-naked, armed savages. I being the only one who had a gun in the diligence, resistance was impossible; my gun was caught by the coachman as I raised to fire. This was done just outside the city gates of Guadalajara, half an hour before daylight; the first occurrence of the kind that has happened to me in all my travels in Mexico. A similar fate awaited us on our return from the Capital, but as I had taken the precaution against loss, we were not so badly damaged. In returning from Mexico I was not idle on the way in my ornithological pursuits. I remained some days at an old friend's ranche near Guadalajara, who having good guns, dogs, and plenty of ammunition, rendered me all the assistance I could desire in making collections in that locality (ten leagues from Guadalajara). Some of the collections made there you will, I think, find interesting; you will see my notes upon the list. I also stopped again in Tepic; you will please notice the list also from that locality, and the list from this locality, as well as the one from the valley of Mexico, marked and numbered, agreeing with the labeled birds accompanying them.

Please send me a list with the numbers agreeing with mine, so that I may know with a certainty the name of each species sent as classified by you, with the Latin name in a clear hand. I was gladdened on the arrival of the steamer yesterday from California (all my dark feelings on me) with the welcome arrival through Wells, Fargo & Co's Express of a large package of books, among which was the much wished for ix vol. (Birds), and also part of your "Review of American Birds," commencing with page 321, ending 368 on Vireonidæ, and very interesting, but you scarcely mention the vireo from the Tres Marias (*hypochryseus*) only in synopsis. To have mentioned this bird as coming from the Marias Islands, and as you say, "largest and most deeply colored of all the species," would make it the

more interesting, in as much as it is found upon these islands, where I know it to be a constant resident (see page 353, review of Am. Birds, and Nos. 83, 84, 85 and 86 in my catalogue transmitted to you of Tres Marias birds). These things are of much importance to me, as I expect to make reference to your valuable and interesting correspondence (by your permission). The review of "American Birds" will, I consider, be invaluable to all ornithologists, whether professional or amateurs, comprising, as it will, such a vast number of species showing the geographical distribution, and of a truly reliable nature. I shall be engaged, during this rainy season which is now upon us, in drawing and writing up my notes, &c., &c.

The Academy of Sciences in Mexico have acted in good faith so far with me in their contract to aid me in my collections and the completion of my work, but the amount is so small without having anything else to depend on at present, makes me feel rather pressed, or compressed, if you like. I have read and re-read your letter of 15th Nov., and I am of the opinion that I often pass or let pass birds which I think I know to be such, that by procuring them would prove to be entirely different. **I shall change my tactics, however, in regard to this matter.**

You can not regret more than I my inability to make Socorro another visit this season, or rather to have made, for now it is too late to go. Jan., Feb., March or April are the best months to go to Socorro. I am sure there are many birds, as well as mammals, reptiles, &c., that remain, yet to be brought to light inhabiting this remote and but little known island. I must, however, bide my time and hope at some future day to make a stay of at least two months. I am not yet done with the Tres Marias. I am anxious to know what names you will give the Socorro birds. How sorry I am that I could not procure more and better specimens. I have trained a young Mexican boy to assist me in my collections, as well as preparing them; he has been constantly with me for two years, and is very fond of the occupation; he is the only valuable article I did not lose when robbed on the road to Mexico (except portfolio); he is a keen observer in natural history and of good service to me.

It does seem to me that when my spirits become the darkest, something comes in like a bird, with good tidings, whose melodious notes have often, as I wandered alone in the wilderness, cheered my lonely spirits and gave me hope, and excited in my heart and soul a greater love for our God, whose works shine forth everywhere in all things so beautiful and mysterious. As we were sitting gloomily at our lonely table to breakfast this morning, when lo! the polite and ever agreeable gentlemanly agent for the steamers in this place (Mr. Wyman) made his appearance, bringing me two more letters from you, besides package of books, among which another copy of vol. ix, also mammals of North America, land and fresh water shells, &c., &c., for which please accept my thanks. I begin to think my old friends have not deserted me, and seeing these welcome visitors, these prizes from the Smithsonian Inst., **I feel once more like old times, and can now work** with better heart; and my dear wife, who ever cheers me in my saddest hours, also felt the agreeable and welcome surprise. These letters are dated Jan. 24th, 1866, No. 9,736, and May the 20th, '66, No. 10,692. These letters and package came through the care of Mr. Hubbard, S. F., but the arsenic you mention did not come.

I need very much the alcohol and cans, and also No. 11 shot, which cannot be obtained in San Francisco.

I shall endeavor to procure for you alcoholic specimens of the *Hilgaro (Myadestes obscurus)*. Have you ever received specimens of this bird from eastern Mexico? I saw two other varieties while in the City of Mexico (in cages), one of which is called *Clarinde* by the natives. Its notes are very melodious, and its colors much darker than the variety found on this side—more of a lead color. The other one I saw there also differs in color, the under parts, under tail coverts yellowish, tail longer than either of the two mentioned. I could not procure one for less than $12 to $20, cage birds.

I shall hope for your co-operation in my work. Any advice or information you may find it convenient to give me will be highly appreciated, and I at the same time will continue my contributions.

I will now proceed with the list of birds I send you with this. Mrs. Grayson sends her highest regards, with many thanks for the letter you wrote her.

Yours truly, A. J. GRAYSON.

The allusion to the contract with the Academy of Sciences may be explained as follows:

Mr. Grayson had previously visited the City of Mexico and been presented to the Emperor Maximilian and the Empress Carlota, both of whom took a deep interest in the water-colored drawings of the "Birds of Western Mexico," and retained his portfolio one week for examination. Through the intercession of Maximilian the accompanying contract (translated) was made with the Imperial Academy of Sciences and Literature. It was through this society, only, which was not in any way connected with the political government, that Grayson was assisted at all, in a financial way, to carry on his great undertaking.

Mr. Grayson had become a member of the Geographical Society in the City of Mexico.

With the downfall of the Imperial government ended Grayson's contract. The new government would assume none of the obligations nor indebtedness of the old one, and the plates, yet unpublished, remained in his possession.

MR. A. J. GRAYSON,
AND THE IMPERIAL ACADEMY OF SCIENCES AND LITERATURE.

Record No. 28.—Mr. Rio de la Loza read a second time the opinion presented by the Mathematical Physical Class respecting the application of Mr. Grayson that the Academy should assist him to publish a work which he is writing upon Mexican ornithology, and the suggestions of which are as follows:

"The undersigned, appointed a committee to suggest in the business committed to them, have the honor to propose the following:

"The Physical Mathematical Class have examined attentively the collection presented to the Academy by Mr. Grayson, and assembled in session on the 24th

of March, have held a long conference with the said gentleman; seen the greater part of his work, and determined the essential points of the dispositions contained in the second number of fraction C, base 4 of the law of the 10th of April; fraction A of the 16th, and the other provisions of the regulation. In view of all, and of the great utility which would result from publishing the work, we advise the Academy, without hesitation to admit the propositions of Mr. Grayson, arranging the details and conditions upon the basis of the understanding had in the conference with him, and which is substantially expressed in the following terms:

"1st.—Mr. Grayson agrees to furnish within 2 or 3 years a work which shall [be] national, and will contain colored steel engravings of all the different varieties and species of birds in this country, with their peculiarities, North, South, East and West, and throughout the Empire.

"2d.—The work will be composed of 4 volumes, and will contain about 100 steel engravings—each carefully drawn from nature, collocating the birds in their natural position[s] in harmony with their habits, while each drawing will contain also the different kinds of plants and flowers situated near the localities frequented by these birds. All the impressions will have 3 or 4 figures representing the birds in their peculiar and most graceful positions. The index will indicate each engraving in the book, which will be published in three languages—Spanish, English and French.

"3d.—The work will be issued at intervals, commencing with the material already prepared and to be delivered in a short time by Mr. Grayson. In order that it may be finally correct, the Academy will appoint intelligent persons charged with its supervision.

"4th.—The first edition will be 1,000 copies, the drawings remaining in possession of the Academy, making in advance such costs as it may desire.

"5th.—In order to complete a work of this magnitude by the time of its final publication, the Academy will give the author 200 dollars per month, in order that all expenses may be met in forming additional collections in different parts of the country, with the understanding that he has explored some points in the East and South of Mexico from Tehuantepec to Sonora, and visited at his own cost the Islands of Tres Marias, Socorro and others, with the object of finding new specimens, and making further additions to the ornithological *fauna* of Mexico.

"6th.—The Academy will be the chief organ of the enterprise, directing it, with the assistance of Mr. Grayson until completed.

"7th.—The Academy will cover the expenses which may be occurred with the proceeds of the sale of the work, the price of which will be hereafter fixed. If these expenses are more than met, one half of the excess will be given the author.

"8th.—As soon as Mr. Grayson shall deliver to the Academy his collection of birds, he will receive 400 dollars besides the monthly pay above referred to.

"9th.—The author declares his work the exclusive property of the Academy and not to be published in foreign countries.

"10th.—In the event of Mr. Grayson's death, all will remain the property of the Academy.

Inasmuch as Mr. Grayson is highly recommended by Mr. Maury, and has exhibited the greatest disinterestedness and most gentlemanly generosity, it is not

deemed necessary to exact terms or security from him. In virtue of this the Class, in the discharge of its duty, presents the following proposition:

"The proposition of Mr. Andreas Grayson is admitted, conformably to the tenor of these suggestions.

"L. RIO DE LA LOZA."

"MEXICO, Feb. 26th, 1866.

"Articles 1, 2, 3, 4, 8, 9, and 10 are approved without alteration. To the 5th article the following addition is made: The author will deliver to the Class every three months his drawings and writings—if this time is not sufficient, a time more convenient will be determined.

"Article 6th is amended thus: The Academy receives the work, admits the propriety, and commits its direction to the Physical Mathematical Class to complete the same with the co-operation of Mr. Grayson.

"Article 7th remains in this form: The Academy will fix the price of the work, will pay all expenses, and should it result in profit, will divide such profit with Mr. Grayson.

"With the above amendments it is decided that this opinion pass to the Minister of Public Instruction, in order that he arrange with Minister of Hacienda to open the respective credit to the Academy.

"FRANCISCO PIMENTEL,

"Secretary of the Interior.

"MEXICO, March 21st, 1866."

By the unfortunate termination of his contract with the Academy of Sciences he was once more left without means to carry on his work. The Boston Society of Natural History and the Smithsonian Institution have been considered as having assisted him in the exploration of the Sierra Madre Mountains. "Neither of the above Institutions" says Mrs. Grayson-Crane, "aided Mr. Grayson in any manner. Just previous to his death, the Smithsonian Institution sent him two hundred dollars, requesting him to explore the Sierra Madre Mountains, which amount I, (by my husband's request) returned and I have Prof. Henry's receipt for the same."

The exploring trips which Grayson made, at his own expense, to the Tres Marias Island and to Socorro Island have been fully treated of in his accounts edited by Mr. Geo. N. Lawrence* with which is given annotated lists of the birds. It was a memorable expedition to Socorro. The little vessel was wrecked, and they subsequently rescued by a passing vessel which landed them

* On the Physical Geography and Natural History of the Islands of tbe Tres Marias and of Socorro, off the Western Coast of Mexico. By Col. Andrew J. Grayson. Edited by Geo. N. Lawrence. Proc. Bost. Soc. Nat. Hist., xiv, 1871, 261–303.

on the Tres Marias from whence they made their way to San Blas. At this place Mr. Grayson's only child, Edward, was drowned, at the age of twenty-two. The solitary dove (*Zenaidura graysoni* Baird) was named for that son.

Mr. Geo. N. Lawrence has also published an account of the birds of western Mexico,* principally from the vicinity of Mazatlan that were collected by Mr. Grayson.

His last expedition was to the Isabel Islands, a group of rocks swarming with water birds.

As the guest of the U. S. S. *Mohongo* he left Mazatlan, April 20, 1869, and at the islands was taken sick with the coast fever. His illness lasted three months and a half, during which time he arranged his affairs as though having a premonition that it was his last illness and his work was done. At Mazatlan, in the night of August 17, 1869, went out the light of that heroic life, which, unaided and untaught, by indomitable perseverance has placed the name of the lamented Grayson in the galaxy with Wilson, Audubon and Gould.

During his last moments his mind wandered, perhaps to scenes of the past, or lingered over some exquisite piece which he had just completed, for his last words to his wife, were: "What a beautiful picture!" He was buried at Mazatlan and his body afterwards brought to San Francisco, for interment, by the Society of California Pioneers.

His age lacked but three days of half a century, not one third of which had he been able to devote to art and science, yet he has left two large sized portfolios containing one hundred and fifty-four water-colored plates of the birds of the Pacific Coast. Most of the plates represent two or more specimens in various attitudes, sometimes with their nests, delineated and colored with extraordinary faithfulness and care. Prof. Baird has sent to Mrs. Grayson-Crane the following testimonial of the high character of the work:

"As far as my own opinion of the work is concerned, I have no hesitation in saying that I consider the memoir, next to the work of Mr. Audubon, the most important contribution yet made to American Ornithology, in the form of good illustrations and interesting

*The Birds of Western and Northwestern Mexico, based upon Collections made by Col. A. J. Grayson, Capt. J. Xantus and Ferd. Bischoff, now in the Museum of the Smithsonian Institution, at Washington, D. C. By Geo. N. Lawrence. Mem. Bost. Soc. Nat. Hist. ii, 1871-1878, 265-319.

biographies. The plates are drawn with exceeding care, and represent the minutest features of the species; while, as it regards the fidelity of coloring, I do not believe they have ever been excelled. I much hope that matters may ultimately be arranged to secure the publication of the work, as I want to see it appear, knowing it will be a worthy companion to the publications of Audubon, Gould and others."

A few of the original drawings were reproduced by wood cuts in *Hutchings' California Magazine* and by colored lithographs (which by no means do justice to the originals) in the *Hesperian.*

The two original volumes of water-colored plates were presented to the University of California in 1879 by Mrs. Grayson-Crane, subject to no other conditions than her right to hereafter publish the same and subtitute a printed copy for the original. A selection of the plates was exhibited at the Centennial Exposition at Philadelphia in 1876.

The appended biographical sketches of birds appeared to be unpublished and are here presented for the sake of the information which is accurate and illustrates the close and careful attention which Mr. Grayson gave to the study of the habits of birds.

ANHINGA or "SNAKE BIRD." *Anhinga anhinga* (Linn.) This remarkable species is usually met with along the shores of inland lakes, lagoons, bayous and rivers in the warmer latitudes, and never on the sea-shore. Scarcely visiting the salt water *esteros*, it is strictly a fresh water bird. Wherever there are streams or lagoons abounding in small fish, there it will be found the most abundant.

Of all the divers or birds that pursue their prey by swimming below the surface, this one most excels. Its form is admirably adapted to rapid swimming and diving, and it can remain longer under water than any other of the feathered divers.

It is sometimes gregarious, particularly in the breeding season, but may be as often met with solitary as in flocks. When fishing it often comes to the surface, either to breathe or devour what it has captured, and when swimming on the surface its body is scarcely perceptible and frequently entirely concealed, whilst its head and neck only are above the water. After it has satiated its hunger it mounts some old log or dry branch overhanging the water and there spreads its wings to the sun in order to dry the plumage. If it should be molested at that time by an enemy, it does not attempt

to escape by flight, for it is then too heavy, but falls headlong into the water and instantly disappears as though a stone had fallen into its depths. It rises with great difficulty from the water when it does make the attempt. The plumage of its pinions as well as the tail are naturally heavy and ridged, and the body itself is very solid and weighty for its size, which would at first lead one to suppose it incapable of extended flight, but this is not the case, for its wings are long and ample and its flight vigorous and well sustained.

After it has dried its plumage in the sun, it is then that it displays its powers on the wing. Its flight is exceedingly rapid and really graceful and at times long protracted—ascending to a great height in circles, frequently in company with the common black vulture, or the wood ibis, and like them sailing in wide circles, seldom moving its wings, at the same time constantly rising in the air until almost lost to vision. After it has enjoyed for a time the cooler air above, it folds its wings near its body and darts like a meteor back to its favorite lake or stream, there to exercise its superior powers in a different element.

Doubtless some of my readers when looking at the picture in which the bird is figured will be reminded of some such scene he has witnessed if he has ever traveled along the thickly wooded banks of the silent streams or lagoons within the regions of the tropics. And the bird, too, he will remember, as it sat perched upon some dry branch overhanging the water, with wings partly spread to the sun whilst its long snake-like neck presented the many excentric and graceful curves peculiar to the species; its hoarse croaking voice, too, as he neared its resting place—all of which may recall to his memory the dismal swamps and quiet streams through which he has passed. Such scenes are familiar to me from my boyhood to the present time. The same which I have often in my younger days witnessed in the cypress swamps of Louisiana are only replaced in western Mexico by swamps of the mangrove and other tropical trees. Such places are the favorite haunts of the "snake-bird."

The nest is usually placed in very tall trees overhanging the water and is composed of sticks and water plants. In the month of May, 1866, I found them building in some large cedar trees over a small sluggish stream that runs through the valley of Tepic. They were quite numerous about this little river which abounded in several

species of small fish among which is the small, yellow catfish. It is, however, quite as common on the Mazatlan River and adjacent lagoons.

INCA DOVE. *Scardafella inca* (Less.)—This lovely little species is like a miniature of the common turtle dove and in the warmer regions of Mexico, it is equally common, but at the same time much more domestic and familiar in its habits. It is more usually found near the habitations of man, frequenting the house lots, gardens, and even the streets of large cities in which its innocent and harmless qualities guarantee its safety from the rudeness of man. It is regarded by the Mexicans with feelings of tenderness, and their mildest expressions of love are referable to this little dove—as *mi palomita*, my little dove. They exhibit the most ardent attachment for their mates and may be often seen caressing each other in a loving manner. But with all their innocent looks, they are possessed of violent paroxysms of jealousy, and a pugnacity equaling the game-cock. I have often seen the males fighting together until they became completely exhausted and unable to fly. When engaged in combat they strike with their wings, which are used with considerable force. Thus these most innocent appearing of all animated beings have their faults also, but as they are not armed with spurs or spines of any kind (like some tame combative birds), their bills being weak and their claws delicate, they are unable to inflict any wounds.

Unlike the turtle dove, they never associate in flocks, but continue in pairs throughout the entire year. They are sure to attract attention by their loving and innocent appearance, as the two seem to be inseparable.

Its voice is plaintive and sad, and my wife never hears it but that, as she says, it reminds her of Tehuantepec and the memorable event of our first setting foot upon Mexican soil, at the port of Ventosa where we suffered a disastrous shipwreck. The notes of this little dove were the first and most common we heard from the strange and interesting land upon which destiny had cast us. Time can not eradicate from our memories the scenes through which we passed in that remarkable region, which were only freshened, and often recalled to our thoughts after a lapse of ten years, by the sweetly sad notes of this dove.

It is exceedingly docile, allowing itself to be approached to within

a few feet, without showing any signs of fear, as if it knew that its very innocence was a shield of protection.

They breed three or four times in the year, and I have found them nesting in the winter months as well as in the spring and summer. The nest which is formed very loosely of small twigs and bits of dry grass, is usually placed very low, sometimes in the branches of a small bush or on the broad leaves of the Opuntia, and not unfrequently they construct a nest under the sheds of the houses, if a suitable beam is found. The eggs are two in number and pure white. The male assists in incubation and feeding the young.

CALIFORNIA VULTURE. *Pseudogryphus californianus* (Shaw).—Is the largest rapacious bird of North America and * * * * it is better known in California than elsewhere, where, previous to the civilization of that country, it was very abundant, approaching in large flocks the near vicinity of the Missions, where it contended with the coyote for the offal and carcasses of cattle slaughtered for their hides and tallow. In the early days of California history it was more frequently met with than now, being of a cautious and shy disposition the rapid settlement of the country has partially driven it off to more secluded localities. I remember the time when this vulture was much disliked by the hunter for its ravages upon any large game he may have killed and left exposed for only a short length of time. So powerful is its sight that it will discover a dead deer from an incredible distance while soaring in the air. A case of this kind happened with myself whilst living in the mountains of Marin County, California, in the year 1847. At that time my main dependence for meat wherewith to feed my little family was my rifle. The hills and mountains there abounded in deer and other game and it was not difficut to kill a deer any day, but to kill a fat one could only be done by accident or the acuteness of a skillful hunter in making such a selection. A four-point buck in the month of July could always be depended upon as savory venison with ribs and haunch covered with tallow. One fine morning I had shot a large and exceedingly fat buck of four points, on the hills above my little cabin. Taking a survey of the sky in every direction I could not discover a single vulture, and, as my cabin was but a short distance from the spot, I concluded not to cover my game as I could return with my horse to pack it

home before the vultures would be likely to trouble it. But for this lack of caution I was doomed, as in many other events in my life, to disappointment. I was gone about two hours, when, on returning, I found my game surrounded and covered by a flock of at least a dozen vultures, and others still coming. Some so far up in the heavens as to appear like a small black speck upon the clear blue sky. So busy were they, tearing and devouring the deer and fighting among themselves that I approached quite near before they saw me, when all arose, some flying a short distance and perching upon the rocks and sides of the hill, while others less gorged were sailing around taking a bird's-eye view of the half consumed deer and my chagrin. Their greed in feeding upon a carcass and their aerial movements remind me of the black vulture *(C. atratus)*, and like that bird they have often been known to gorge themselves so as to be unable to fly.

The California vulture seems to be entirely restricted to the regions west of the Rocky Mountains and its geographical range does not extend as far south as Cape St. Lucas, nor north to Washington Territory. Its flight when ascending is a quick movement of the wings and alternate sailing in circles till out of sight. It soars to an immense height and is endowed with such a far-seeing eye that it is able to discover over a great expanse of territory any dead animal which may happen to be exposed to view. * * * * The home of this vulture is amid the clouds and in the wildest mountain regions it seeks for a retreat and to repose, usually prefering to perch upon rocks than upon trees.

KING VULTURE. *Sarcoramphus papa* (Linn.)—I found it quite common on the Isthmus of Tehuantepec, more to the Atlantic side, however, than the Pacific, and have not seen it except in confinement in any of my wanderings in western Mexico. From the best information I could obtain it seems to prefer the wild mountainous regions to that of the near vicinity of civilization, and its habits are not unlike those of other species of this family except that it is a little more particular in the selection of its food. It is rather sluggish and flies heavily. * * * * In crossing the Isthmus in 1857 and near the Magonia River, we frightened up five or six of these vultures which were feeding upon a dead horse, one of them which perched upon a neighboring tree was shot and proved to be a fine specimen, but for want of conveniences we were un-

able to save it. There were no other species of vulture near this dead animal. I am of the opinion that it seldom makes its appearance on the western coast of Mexico.

COOPER'S HAWK. *Accipiter cooperi* (Bp.)—I shot a specimen of this hawk at a ranch near Rio Mazatlan. It had just made an unsuccessful raid upon the poultry yard and created great consternation among the hens with their broods of small chickens. It continued on, flying very near the ground for about a hundred yards and perched upon a low stump. Like the sharp-shinned hawk and one or two others of closely allied species it has the habit of flying very swiftly near the ground when hunting for its prey, as if to come upon it suddenly without being seen, at times rising and falling in an undulating manner, resembling the flight of the yellow-hammer woodpecker. When thus upon its tour of rapine the birds lie close under cover, well knowing the brave and desperate spirit of this keen little hawk. At last he surprises a flock of quail, his favorite game, onward he dashes among them, the affrightened birds are so confused and panic stricken as scarcely to know which course to flee, they scramble in every direction, but the reckless hunter in an instant has selected one and furiously dashes headlong amidst the brambles and grass in which the unfortunate game endeavors to make its escape. But too late, crying and plaintive notes of the poor quail are heard, he has seized it in his powerful and sharp claws and immediately bears it off, flying near the ground until he finds some secluded spot beneath a canopy of bushes and vines where either upon a prostrate log or on the ground he devours his prey at leisure. Not a few of similar incidents have I witnessed with this hawk, or its near allies.

I have found this hawk not uncommon in the locality of Mazatlan during the winter months; it is most usually met with about old fields where there are brambles which the kind of prey it seeks inhabit. Field mice and other species of small rodents form a part of its subsistence as well as birds. Of all the hawks it is perhaps the greatest chicken thief, and is a terror to the old hens and chickens of the farmyard. Once it commences upon a brood it will return daily until many are captured. It usually perches beneath the thick foliage of a tree, or in some obscure place near the ground, where from its place of concealment it slyly watches its opportunity to pounce upon its prey. * * * * * I am unable to state

whether this hawk breeds in western Mexico or not, not having the good fortune to encounter its nest. It is quite probable, however, that it breeds in California and Oregon, where young-plumaged birds have been obtained. * * * * *

TRES MARIAS YELLOW-HEADED PARROT. *Chrysotis levaillanti* Gray.—In the wild and densely wooded islands of the Tres Marias, hitherto but little known and uninhabited, I found this large and handsome parrot in considerable numbers. Its appearance there and not upon the adjacent coast seemed to me very remarkable, as it possesses sufficient powers of flight to pass back and forth it it so desired, and the same kind of food upon which it subsists could be found in equal abundance, yet it never visits the mainland voluntarily. It is without doubt peculiar to these islands, where nature had produced and destined it a local habitation. Therefore its geographical range is more limited than that of any parrot found upon the mainland. Doubtless they are more contented in their quiet island home, than the roving species that are ever restless. Knowing no other country but their little flowery forest world, with the native songsters for their friends and acquaintances, they led a happy and obscure life of contentment and safety, until man the destroyer made his appearance among them.

It is only within very recent years that one of the islands has become partially inhabited by the cutters of *cedro*, and as recently as 1865, when I visited these islands for the first time, I found these birds so tame and unsuspecting at the approach of a human being, as to be easily taken, simply by putting a running noose of twine upon the end of a slender pole and slipping it gently over the head, while they were busy feeding among the low branches or quietly sitting upon the limb of a tree.

Many of these parrots are captured by the wood cutters and sold to the vessels touching there for a cargo of timber. They are also carried to Tepic, San Blas, Mazatlan and other points on the coast and sold for from one to five dollars. Upon a subsequent visit to these islands in 1867, on my return from Socorro Island, I found that their numbers had diminished considerably, and they had become so shy as to be difficult of approach. They had learned the arts and tricks of man, and kept him at a respectable distance.

When captured after they are fully grown, they never learn to talk and seem very unhappy and unfriendly in confinement, keep-

ing up a constant squalling of harsh and discordant jargon, which is very disagreeable. But if they are taken from the nest before they are fledged, they may be taught to utter some words very distinctly.

I saw nests of this parrot, all in the hollows of large trees, one only of which I was able to reach. This one was in a large smooth bark tree, known here as "palo prieto." The entrance was much larger than the bird required; it was where a limb had broken off close to the trunk, about sixty feet from the ground, inside of it there was a very large hollow, about as deep as I could reach with my arm. The eggs (two in number) lay upon the bare rotten wood which had been a little scooped out, forming a slight indentation. The eggs are a clear white, and a good deal larger than a tame pigeon's and of an elliptical form. They were so far advanced in incubation, that I was unable to preserve them. When I discovered this nest, which was in a very secluded and shady spot among large trees, the male was sitting alone on the branch of an adjacent tree, apparently keeping watch while the female was sitting. Being a fine looking specimen I shot him. I continued my ramble through the woods and in about an hour returned to the spot. I sat down beneath the shade of the tree containing the nest, to consider the chances of getting up to it. Suddenly the female made her appearance in the door of her domicile; after looking around she at length gave a long, low whistle, as if calling her mate, but there came no answer; in a few moments she gave another a little louder, still she only heard the echo of her own voice in the silent woods. She finally gave a loud and angry scream, yet there came no response. After waiting for a few moments in doubtful suspense, muttering something to herself, which seemed plainly to say, "Why doesn't he come?" with apparent disappointment she returned into her nest.

The following day I returned with assistance to climb the tree, but before we made any attempt to do so, she came to her door, and went through the same performance of calling for her mate as on the day previous. There was something touching in the peculiarly saddened tones of her voice on this occasion, which was very different from the harsh and angry scream of the day before when she first missed her spouse. Before I reached the nest she flew off a little distance and perched upon a branch from which she watched us in silence desecrating her sacred abode.

These parrots are always found in pairs and many pairs congregate together forming large flocks. During the breeding season, the pairs divide off and do not mingle together until the young are able to fly. Their breeding season is in March and April, and both birds assist in incubation.

In the evenings they may be seen in flocks or pairs flying at a great height, going to the mountainous portion of the island to roost. Their flight appears easy, and in a straight line without undulations and is performed by the constant and moderate movement of the wings.

They feed principally upon the kernels of various kinds of hard seeds and particularly upon a large bean of a species of acacia which is in great abundance, they are also very fond of the seeds of the morning glory *(Convolvulus)* which grows here very rank, ascending and spreading over trees of considerable height.

Like all the species of the *Psittacidæ* this parrot feeds its young by ejecting into their mouths the well masticated food from its own stomach and I have seen the grown ones receive food from their mates in a similar manner, when caressing each other upon the limb of a tree. After their morning's repast they repair to the most secluded and shady retreats, where they spend most of the day, keeping up at times their loud squalling notes and alternately dozing. When the shades of evening begin to appear they again assemble in flocks, flying about in different directions in search of food. At a later hour they ascend to a considerable height and seek their resting place.

Figure in plate (male) nearly nat. size.

Remarks.—Specimens of this species sent to Prof. Baird of Smithsonian Inst. for identification. In a letter to me he states that he thinks it a new and undescribed species. In this remote region, with but few books for reference, it would be difficult to identify species without such valuable assistance from one of the best and most comprehensive ornithologists of America, with whom I have long had an agreeable and interesting correspondence.

ROAD RUNNER. *Geococcyx mexicanus* (Less.)—This remarkable bird—which the Mexicans call "Churea," or "Correo del Camino" (Road Runner), so called from the habit it has of sometimes running along a path or road—seldom fails to attract the attention of the traveler by its solitary and peculiar habits, often, too, in the

mountainous regions and desert countries, where no other living creature is to be seen. Although met with in such localities, it is, however, not entirely confined to them, as it is an inhabitant of some portions of the thinly wooded parts of the *tierra caliente* of the west, where the trees are scrubby and the country open, as also of the barren and rocky great central plains of Mexico. It seems to prefer a hilly country but scantily supplied with vegetation, where the various species of cacti form impenetrable thorny thickets, and the *Agave americana* rears its lofty stem amid its clustering sharp-pointed leaves, where the *Ucas* tree with its thousands of dagger-pointed leaves thrive best, with here and there a scrubby thorny bush, precipitous and deep gorges of basaltic rock, and the far-stretching horizon wild with strangely-formed mountains. Here the road-runner wanders in solitude, subsisting upon grasshoppers, mice, lizards, etc. It has no song to awaken the eternal silence that surrounds it, but silently and lonely pursues its avocation undisturbed in these desolate localities.

The road-runner is seldom seen perched in a tree, although it not only roosts, but builds its nest in a low and thickly-branched *Mimosa*, and passes some portion of the day amid its branches, amongst which it jumps with as much facility and activity (for which its feet seem to have been intended) as it does upon the ground. Thus it would appear to be partly arboreal as well as terrestrial. It is most usually met with upon the ground, and as soon as it discovers the presence of danger or the intruder, instantly runs off with remarkable fleetness to the nearest thicket or hill, where it generally escapes from its pursuers, either by concealment or a short flight from one hill to another. If a tree with low branches be convenient it will spring into that, and, soon reaching the top, will fly off to a distance of an hundred yards or more. It appears to rise from the level ground with much difficulty, owing to its feeble anatomical structure, or apparatus for flight, the sternum measuring but little more than an inch, and the muscles of the wing being small and weak, the wings also being very short. Its muscular powers are mainly embodied in its stout tibia and tarsus, which give it the power to run with great swiftness. It is very quick in its motions, active and vigilant; indeed, its fleetness enables it to elude its pursuers although one may be mounted on a good horse, or a dog may be in the train; but this is only for a

short distance, as it could soon be run down by the horse or dog were not some convenient thicket or hill near, from which to take its flight or conceal itself among the branches.

At first sight one would suppose the road-runner, from its terrestrial habits, to belong to the pheasant or to the gallinaceous species, but when examined more closely it resembles them in no particular.

The most remarkable feature about it, for a bird that passes most of its life upon the ground, is the form of its feet, the arrangement of the toes being zygodactyle or in pairs, two of them anterior and two posterior, which places it with the cuckoos, birds that are strictly arboreal; thus in this genus we see an arrangement of the toes, as strange as it is contrary to that of all ambulatory birds.

I have met with the road-runner frequently in my travels in various parts of Mexico and California, but have seldom seen it in company with other birds, either of its own or other kinds. I have sometimes seen them in pairs, and on one occasion, in Tehauntepec, I observed three or four together; these were among some tall weeds, and were uttering a few low, hoarse notes, but as soon as I was discovered, they immediately struck off in different directions and were soon lost to my sight. It is exceedingly shy and solitary in its habits, inhabiting the wildest and most unfrequented places.

When I resided in San Jose, California, I had in my possession one of these birds which I kept in an exclosure of wire about ten feet square. It soon became quite tame, taking its food from my hand. I fed it principally upon raw meat, and sparrows which I captured in traps set in the garden, on purpose for my pet. These he would devour entire, after first picking out the wing and tail feathers; it appeared to be a difficult morsel for him to swallow, but he never failed after a few attempts. When a bird was given to him alive, if not very hungry he would play with it before killing, as a cat will do with a mouse, taking it in his bill and putting it in the center of the inclosure, where he would let it go; but as soon as the sparrow would attempt to make its escape, it was very quickly recaptured by its overpowering enemy and brought back to the same spot, when another opportunity would offer for its freedom, but to no purpose, the road-runner was too quick for him. After worrying its victim for awhile in this way it would finally kill it by taking it in its bill and beating the life out of it on the ground, as a

flycatcher does an insect. As soon as the sparrow was completely dead it would then pick out the wing and tail feathers and swallow it entire, head foremost; all its food is swallowed entire with considerable voracity. Although I gave him lizards he did not seem to care for them, and it is probable they are only resorted to in cases of extreme hunger. Grasshoppers appear to be its principal food, together with insects.* It doubtless devours both field mice and small birds, when such objects are attainable.

During the time I possessed the one mentioned above, I turned loose in his inclosure a pair of quail and a sharp-shinned hawk (*A. fuscus*) for his companions, but this intrusion only made him restless and unhappy, and he exhibited extreme fear of the hawk. The little hawk in a few days attacked and dispatched the quail; at the sight of which the road-runner showed renewed symptoms of fear and distress, frequently uttering a harsh note of anger not unlike the sudden twirl of a rattle. The little hawk often made darts at him, but he evaded its sharp claws by his activity. I believe, however, the hawk would have eventually conquered and killed him had I not removed the former from the cage.

Strange and to me seemingly fabulous stories are told by the native Californians of the road-runner's peculiar ingenuity in destroying the rattlesnake, and I was informed by a respectable native gentleman of that State that he witnessed the feat himself.

It is said that when the road-runner finds a rattlesnake coiled and asleep, it corrals him or builds a fence around him of the cactus burrs with their innumerable sharp spines. After completing the corral it then commences to tease and worry the snake by darting at and pecking it with its stout bill. The snake in endeavoring to extricate himself from his thorny inclosure finds himself pricked on every side by the sharp spines of the cactus, and, tantalized by the bird, becomes infuriated, bites himself and dies. This I do not vouch for.

Although the road-runner has no song, yet it is not entirely without a peculiar hoarse cooing note during the love season, which is uttered at intervals, something like that of the Yellow-billed cuckoo (*C. americana*), but deeper toned, as ho–o–ho–o–ho–o–ho–o–. I was first attracted by this sound in April, 1864, in the

* The stomachs of all those dissected by me contained exclusively grasshoppers.

foothills of the Sierra Madre Mountains; it was a strange sound to my ear, and I searched for its cause until I discovered the bird sitting in a low bushy tree. It was a male and in fine plumage. Since then I have occasionally heard it in the *tierra caliente* region near Mazatlan.

The one figured in the plate is from a specimen shot near Mazatlan, and agrees with Baird's description of the smaller species, *G. affinis* (Hartlaub). It is an adult male.

I had the good fortune to discover the nest of the California species [*G. californianus*] in the Coast range of mountains east of San Jose, but the nest had no eggs, and contained only the newly-hatched young, three in number. It was placed low down in the horizontal branches of a California buckeye, and composed of small, dry twigs, rather loosely put together. The old bird kept at a respectable distance whilst I was examining her treasures, and seemed to express much solicitude during my presence near to her sacred domains. I have sought in vain for other nests, but such discoveries could only be accidental. A female procured by me near Mazatlan, shot in July, proved upon dissection to contain nearly developed eggs and several of the ovaries were much enlarged.

"ROSE-BREASTED FAN-TAIL." *Granatellus francescæ* Baird.—This bird is one of a number of new species discovered by me during the past year upon one of the Tres Marias, a group of islands of the west coast of Mexico, about eighty miles west of San Blas. Prof. Baird has dedicated it to my wife, to whose encouragement and assistance I owe so much of the persistency and success with which I have prosecuted the study of the ornithology of western Mexico, giving the bird her name (Frances).

Whilst examining and exploring these beautiful islands, I frequently met this handsome little bird in the deep recesses of the forest, where amid the solitude of the woods of these quiet islands, it might be seen hopping about among the low brush, busily searching for the insects upon which it feeds. It is solitary in its habits and does not sing; its note is very feeble. In the plate are three figures, two males and one female. The moth and flower represented I found upon the islands.

YELLOW-GREEN VIREO. *Vireo flavoviridis* (Cass.)—The Mazatlan vireo *(V. flavoviridis)* appears to be a spring visitor to this re-

gion of Mexico; making its appearance about the latter part of April and in May. The males arrive first, as their cheerful little song, which is continued throughout the day indicates their presence. About the latter part of May they have paired off and the nests commenced. The nest is usually placed low down, suspended between the forks of a horizontal branch, in some shady and secluded spot. It is half spherical in shape and most beautifully and compactly formed, composed of the lightest material, fastened together and attached to the branch by means of the silken floss of the spider and caterpillar, the whole of which is more or less glossed over with this substance. The inner part is lined with elastic fibres, but no downy material is used inside. The eggs are usually three in number, sometimes four, purely white, with very delicate reddish spots. After their brood is fully fledged, they disappear as mysteriously as they made their appearance in spring. I have never seen nor heard one after the rainy season, which terminates in October. They doubtless return to Central America, from whence specimens have been sent to the Smithsonian Inst. from Panama, collected in the month of January. Specimens have also been received by the Inst. from Monterey, Mex., Colima, Mexico, and Costa Rica. From the evidence of these facts, it would appear to be an entirely western species. But our present bird has not so extensive a geographical range, being recorded only from such localities as heretofore stated in this paper. There is no appreciable difference in the colors of the sexes. The figures in the plate, male and female and nest represent the life size, drawn from fresh specimens. The nest, branch and flowers are as I found them in the woods.

"BLUE MOCKING BIRD." *Melanotis cærulescens* (Sw.)—The blue mocking bird is the common name which I have adopted for the species, from the fact of its disposition to imitate the notes of other birds and sounds, which it does to a considerable extent, but not in such perfection as our celebrated mocking bird, *Mimus polyglottos*. Its song however is melodious and of great compass, at times making the woods echo with its charming notes. It is a species which inhabits the densest thickets and woods of the "tierra caliente" where it keeps itself mostly concealed from view, but often makes its presence known by its peculiar song. It is solitary in its habits and equally as unsociable as the common mocking bird. Two males can never occupy the same approximate locality in peace

and often furious combats take place between them, resulting in the victor keeping possession of the favorite spot. It spends much of the time upon the ground, turning up the leaves with its bill in search of insects in the same manner as most thrushes. The Mexicans call this bird *Mulato*, for what reason I could never ascertain. It is one of the favorite cage-birds with them, and its pugnacious propensities often cause it to lose its liberty. A cage or rather trap is constructed with two apartments, one upper and one lower; the lower contains a live bird of the same kind, whilst the top of the upper is raised and set like a trap. It is placed in a thicket where one of this species is known to frequent, and, as soon as it discovers the one in the cage, it immediately flies to it, and in its endeavors to get at it, finally touches the spring of the trap and is itself encaged. In this same manner the common mocking bird is also captured, but it never sings after losing its liberty. The natives often sell them to strangers, knowing full well that they will never sing in the cage. It is only when they are taken from the nest just before they are able to fly, that they become good singers. Not so with the blue mocking bird, the old birds if taken from the woods and well treated will soon become reconciled and cheerful and sing from morning till night. It is indeed a very interesting cage-bird, easily kept and becomes very docile, whilst its song is surpassed by few of the feathered vocalists.

The blue mocking bird does not migrate. It seems to have strong local attachments where it has taken up its abode, and seldom departs to any great distance.

Its flight is low among the dense foliage and brush in which it is usually found and never long extended. It is very shy, though possessed of a good deal of curiosity.

I found this bird quite abundant on the islands of the Tres Marias and in that locality it was very tame and unsuspecting. They often followed me in my rambles in the virgin forest, and I sometimes seated myself on an old prostrate log, when they would come around me in a very inquisitive manner, looking into my eyes, and observing every movement I made. I tossed them bits of hard bread, which I carried in my pocket; they would immediately seize, and after examining it would beat it against a branch or rock, swallowing the small pieces broken off. I one day threw to one which was near me on the ground, the end of my cigar which I had fin-

ished smoking; it picked it up and came with it to the log upon which I was seated, within a few feet from me, then thoroughly inspected the bit of cigar, carefully picking it to pieces as if to discover what was inside; at length after its curiosity was fully satisfied, it perched upon a branch near by, upon which it repeatedly wiped its bill, doubtless having become slightly nauseated with the tobacco. I often found them beating the land snail shells against a rock; this they would continue to do until able to extricate the snail which it swallowed with gusto.

Upon the islands they are more numerous than on any part of the mainland, and like many other birds which I found there common to the mainland, whose powers of flight are weak, they never migrate. It seems a mystery as to how they became denizens of these island wilds, when we take into consideration these facts and the wide expanse of sea to be crossed. But Nature in her mysterious plans seems to awaken into existence the creatures best suited to the localities she has provided for them.

This thrush subsists upon insects and their larvæ as well as the various kinds of wild fruit, which, one kind or another, may be found at all seasons in the tropical woods. Its geographical distribution extends over the greater part of Mexico. It is quite common about Tepic and Colima; in all wooded districts and particularly in the warmer regions of Mexico it may be found. It is recorded from Jalapa, Valley of Mexico and Mirador and I found it in Tehuantepec, but not common there.

Figure in the plate, life size.

ROSE-BREASTED THRUSH. *Rhodinocichla rosea* (Less.)—Prof. Baird states, in his "Review of American Birds," that this species was originally described from Caracas, Venezuela. Mr. Lawrence of New York has received it from the line of the Panama Railroad; while the Smithsonian Institution possesses specimens from Colima and Mazatlan, western Mexico, collected by Xantus de Vesey and A. J. Grayson, thus showing its very extensive geographical distribution within the tropical regions.

It is a bird very exclusive in its habits, and would rarely ever be seen unless cautiously sought for, or by accident, so closely does it keep near the ground in very dense thickets. Its notes alone discovered it to me, as also many other species which I have collected in the impenetrable forests of western Mexico.

One who is accustomed to the woods, and has spent the most of his existence amid its wild life, especially if he be an observer of nature, becomes familiarized with the varied notes of birds. Their expressions of alarm, their call or love note, and many other peculiarities are understood almost as well as his own language. He easily recognizes each bird (though he may not see it) by its voice alone, and quickly detects a strange note of some one unknown to him. While I was collecting specimens at a little hamlet of Indian huts on the Mazatlan River, surrounded by a heavy forest, interspersed with clearings which were overgrown with brambles, I first met with this beautiful species. I was traveling slowly along a narrow path flanked on either side with impenetrable brakes of thorny brush, canopied with innumerable creepers that barred all possibility of penetrating its depth with my eyes. It was in the latter part of June, the morning was fresh, and the leaves were dripping from the copious shower that had fallen during the night. This was the first rain of the season, and the feathered creation seemed to have been awakened to an unusual degree of animation. Amid the numerous voices of song, and the chattering and screaming of parrots, one full and melodious note was caught by my ear, which I at once felt to be that of a stranger. Although it had some resemblance to that of the blue mocking-bird, whose imitations of other birds had frequently deceived me, yet with a close attention I was convinced that it was an unknown species to me. With a great deal of scratching and pricking by the thorns, I at last succeeded in reaching near the spot where I thought it was; but its song had ceased. I, however, sat down upon the ground, completely canopied by the mass of convolvulus and other creepers that overspread the thorny bushes, beneath which a tolerably clear view along the leaf-covered ground could be had for forty or fifty yards. After remaining seated for about ten minutes I perceived a bird quite near me upon the ground, busily turning up the damp leaves with its bill, looking steadfastly for a moment at the turning up of each leaf to discover the insects it was in search of, in the manner of some wood thrushes. I at length shot it, and it proved to be the female of the very bird I was looking for. It was new to me, and I felt pleased with my morning's work. The following day I returned to the same spot, and was soon gratified by hearing the rich melodies of the male, as well as getting a sight of it. By

remaining quiet I succeeded in procuring two fine male specimens in excellent plumage. After I had once discovered its hiding-places and knew its habits, I procured specimens in other localities, in the vicinity of Mazatlan, in both summer and winter months.

The song of this bird is charmingly melodious and full, resembling in its general tone some of our wood thrushes. It is very timid, never venturing into an open sunlit spot, but always concealed, and inhabits the darkly shaded solitudes. It is not a common or abundant species in this vicinity.

Figures in plate—two males and one female; about or little less than life size.

SOCORRO WREN. *Troglodytes insularis* Baird.—Upon nearing the rock-bound shores of the remote island of Socorro, the first melody that reaches the ear of the weary, sea-worn traveler, from its groves and rocky dells, are the sweet and cheerful songs of this busy and lively little wren. Indeed, upon my first visit to this island for the purpose of collecting the strange fauna peculiar to its wild solitude, the notes of this little bird were the first to greet my ears, as they came wafted by the breeze to our vessel, elating and filling my imagination with the pleasing prospects of finding it well peopled with the objects of my research.

This diminutive species is very abundant and well distributed over the island. Like other members of this family, its attire is modest and unpretending, but its song may be heard throughout the day, either among the trees or brushy covered rocks that crop out everywhere. Like all the birds of this locality it appears to be insensible to the close proximity of man. They seemed to rather court our society, and many of them came round our camp feeding upon the meat of crabs that were killed or the gleanings of our table. I never tired watching them climbing about over old logs or the trunks of standing trees, creeper-like, and often turning up the leaves on the ground at our feet in search of food. In the midst of all this busy occupation for subsistence, it frequently stops and mounts a bunch or twig to pour forth its cheerful little song, which is of considerable volume for a bird so small.

They have not yet during my stay fully commenced nesting. I, however, found a nest without eggs in a knot-hole of a decayed tree, which sufficiently proved to me that they rear their young in

such situations or in the cavities of rocks, and not in the branches of trees or bushes, as one species *(Thryophilus sinaloa* Baird*)* does on the mainland.

The present species is the only representative of the genus found upon the island. It is new and hitherto undescribed. Specimens of this, as well as all the land birds of the island, have been sent by me to the Smithsonian Institution for identification.

Figures in the plate represent male and female, natural size.

GREAT MEXICAN CREEPER. *Dendrornis mentalis* Baird.—In its habits this singular creature very much resembles the common creeper *(Certhia americana).* It is however very creeper-like in its general appearance as well as in some specific characters, and any one acquainted with the habits of the two birds would at once recognize in this a marked resemblance in all of its peculiarities. Like the little creeper it inhabits the oldest and darkest forests. Scaling each tree from its roots upwards, searching the cracks in the bark for insects upon which it entirely subsists, circling around from one side of the tree to the other in its upward course until reaching a certain height, when suddenly it apparently drops to the root of another tree and immediately commences its ascent as before. Thus for hours it continues its avocation in performing the duty with which nature has invested it, ridding the trees of destructive insects that may infest them. Often have I watched it, when seated upon an old log, in the shadiest woods, performing its excentric maneuvers, whilst my presence was hardly noticed. It is quite unsuspicious of harm from man and may be approached to within a few paces, without its taking alarm from such intrusion. When it does it will fly off to a neighboring tree, and, if it discovers that you are in pursuit, it will dodge around to the opposite side of the tree and occasionally peep round at you whilst moving up towards the higher branches, as if to learn your intentions. Its enormously long, curved bill enables it to probe deeply in the old trees for its food, whilst its very acute claws and the rigid points of the tail feathers sustain it upon the side of the tree, in every respect like the woodpeckers. I have never observed it pecking in the decayed parts of trees as woodpeckers do, indeed the form of the bill is unsuited for such work.

It is rather a seclusive and quiet bird, but seldom uttering its note, and that only during the love season, when calling its mate;

then its loud, shrill, warbling whistle, may be heard frequently during the day in those localities to which it resorts.

At times two or three or more may be met with in near proximity, always busy in searching for food.

Although its wings are ample, yet its flight does not appear to be long continued and is usually very low, below the branches of the trees, as if endeavoring to keep concealed as much as possible in the dark and silent woods.

The nest which I discovered near the Rio Mazatlan was in a decayed tree, with the top and limbs broken off and overhung and festooned with vines. The pair had taken possession of a deserted woodpecker's nest and I often observed both the male and female pass in and out separately. I watched them for several days and when they were not about the hole, they were near by on some other tree. The nest was about twenty feet from the ground, and I am sorry to say I was not able to procure the eggs owing to many difficulties and the means of reaching the nest.

DRYMARIA IN BAJA CALIFORNIA.

T. S. BRANDEGEE.

Eight species belonging to this genus, including the two here described, have thus far been found in Lower California. *D. viscosa*, a little sandwort, is the most northern extending from Socorro, where it was first collected by C. R. Orcutt, nearly to Todos Santos. *Drymaria debilis*, which also is found away from the Cape Region *(Purisima)*, may be too near the imperfectly defined *D. cordifolia*. The rest, excepting *D. holostioides*, belong so far as I know, on the peninsula, to the Cape Region *D. arenarioides (D. Frankenioides)* credited to Xantus, from Cape St. Lucas, I did not find.

Drymaria holosteoides and D. *crassifolia* were collected near Cape St. Lucas and described by Mr. Bentham in the Botany of HMS. Sulphur. *D. crassifolia*, according to Dr. Gray, was again collected near Cape St. Lucas by Xantus and has also been identified by him with *D. polycarpiodes* of Plantæ Fendlerianæ. Since then this form has been collected by Dr. Palmer about Guaymas and on the Peninsula at Los Angeles Bay, La Paz and other places, and I have found it growing abundantly throughout the middle portions of Baja California. This year at San José del Cabo a plant was

found growing in the clean sand of the sea shore which seems to be the true *D. crassifolia*, and it is not the plant now generally distributed under that name. A careful comparison of specimens belonging to this form and the common form now known as *D. crassifolia* convinces me that the latter for many years has been masquerading under an alias and should be known as *D. holosteoides*.

Mr. Bentham writes of *D. crassifolia:* "This species is near *D. holosteoides*, but forms dense tufts covered with leaves and flowers; the leaves are thicker and more glaucous, and the flowers larger, and on longer stalks." This general summing up of the differences between these two nearly allied species shows just the differences between the two forms I have found. The one from the sea-shore near San José del Cabo grows in dense rounded clumps, has thicker and more glaucous leaves, and flowers on larger stalks and must be the *D. crassifolia* of Bentham's description, but it is not the plant distributed under that name. The description of *D. holosteoides* is very full in the Botany of the Sulphur and that of *D. crassifolia* is short, the species being distinguished in these descriptions mainly by comparison, and now having specimens of both before me there isno doubt as to the plants meant by Mr. Bentham.

D. holosteoides is annual, low, usually prostrate-spreading, somewhat glaucous, pubescent; leaves ovate, cuneate at base, thickish; pedicels scarcely equalling the leaves.

D. crassifolia grows in thick rounded clumps, is more glaucous, entirely glabrous, has thicker leaves, and pedicels slightly longer. The margins of the petals are not so evidently scarious. It is perhaps perennial. The flowers of both are nearly alike, those of *D. crassifolia* have narrower petals and in this respect differ from the description.

These species are certainly nearly related as Bentham writes, and the differences may be caused by exposure, soil, etc., but the growing plants seem very distinct. If ever they should be proved to be not specifically distinct, priority of place should make the name of the species *D. holosteoides*, but if they are considered to be two species, the one distributed should be known by that name and the thick, glaucous leaved one as *D. crassifolia*.

Drymaria Fendleri Watson is a common species of the peninsula. It agrees well enough with the New Mexican specimens formerly classed with *D. glandulosa*, to which according to the de-

scription in Rel. Hænk. they must be very closely related. They are rather less pubescent than the northern forms known to me, and the stamens are 3–5, most usually 4. Specimens of *D. Fendleri* from New Mexico, in the herbarium of the California Academy of Sciences, have usually three fertile stamens, with one or two small or abortive ones. The number of the stamens has probably very slight value in classification.

DRYMARIA CARINATA. Annual, weak and slender, nearly glabrous, 1–2 dm. high; leaves ovate or cordate-ovate, apiculate, cuneate at base, the broader ones 15–16 mm. long, 17–18 mm. broad; petioles nearly as long as the leaves; stipules setaceous: inflorescence loosely cymose, dichotomous; pedicels filiform; sepals 1½ mm. long, strongly carinate by the deep green midnerve; the margins broad, scarious; calyx widely spreading in anthesis; petals oblong ½ longer than the sepals, deeply 2-lobed, the broad margin continued nearly to the base: stamens five, all fertile; filaments linear, flattened, nearly as long as the sepals: style cleft half-way to the base; seeds light brown, minutely roughened.

A common species of the high mountains of the Cape Region.

DRYMARIA POLYSTACHYA. Perennial, growing in clumps from a woody base, pubescent and somewhat glandular; stems 8–10 cm. high, sparingly branched; leaves rather thick, broadly cordate, acute, 1 cm. or less broad, ½ cm. long, on petioles of nearly the same length; stipules small, lacerate; peduncles terminal 1–3-flowered; sepals ovate-lanceolate sub–3-nerved: petals bifid nearly twice as long as the sepals, the long claw naked: stamens 3–5 all perfect; filaments linear, flattened; ovary stipitate above the cupulate disk into which the stamens are inserted at the summit, the petals at the base a considerable distance from them; seeds brown, tessellated in many longitudinal rows.

Growing on cliffs near San José del Cabo.

OCCURRENCE OF A MIOCENE SHELL IN THE LIVING STATE.

J. J. RIVERS.

NASSA CALIFORNIANA (Conrad). *Schizopyga californiana* Conrad.

The discovery of this species in the flesh will be of interest to conchologists and geologists alike. It has hitherto been only

identified in the fossil state though there are two examples of this shell mixed with the set of *N. perpinguis* in the State Survey coll. at Berkeley and are labelled Santa Barbara. In the State Survey collection of fossils there are two shells from the Pliocene of Fernando, Los Angeles County, these shells are *N. californiana* but are named *N. perpinguis*. Good specimens occur in the D. O. Mills collection at Berkeley but are labelled *N. perpinguis* instead of *californiania*, they are from the Post Pliocene of San Pedro, Cal. *N. californiana* is in D. O. Mills' coll. as *N. fossata* from the Pliocene or Miocene of Soquel, Santa Cruz County, California.

The confusion in the classification of the above was in part due to the bleached and the partially effaced condition of the examples, but much more to the terseness of the original description together with the caricature of a figure as given in P. R.R. Rep., vol. vi, p. 69; pl. 11, fig. 1. Then not forgetting the misleading injunction that the species had some relation to *cancellaria* there is every excuse for not making out the type. A figure and description are now given.

Description: Generally ventricose; cancellate; slightly tabulate on the upper portion of the whorls near the suture; where the revolving ribs cross the longitudinal ribs there occurs a considerable nodule; body whorl with about ten prominent revolving ribs and with about three less conspicuous at the base; the basal channel ceases just before reaching the columella; the inner lip obsolete on the columella; columella smooth without teeth or tubercles; outer lip strongly sinuate with the extreme edge crenate. Whorls of the spire about five. Ground color white; revolving ribs purplish brown; epidermis yellowish white; varieties occur with omission of color in some of the revolving ribs which gives a faint pattern of banding. Length 30 mm.; width 11 mm.; spire 10 mm. Dredged in Drake's Bay in 25 fathoms.

Of all the American *Nassas* it is most like *trivittata* Say, but is very much larger though not so compact. The European *N. reticosa*, a Tertiary shell, has a deal of the aspect of *N. californiana*.

The discovery of this shell in the living state brings back to life a species that had been considered entirely extinct. This mollusk like all other things continues by virtue of favorable conditions.

Being a lover of deep water it has lived and died through the ages, in Drake's Bay or contiguous areas, until its habitat was intruded upon by a dredge, a modern machine for catching fish, and which, by chance, at the same time laid bare a surprising peice of biologic history. A long time ago was the Miocene age! If this shell is truly of Miocene times, then it has been sustained from then until now through some of its progeny always finding a suitable habitation to dwell in notwithstanding the vast upheavals and depressions that have alternated the coast line of California since the Miocene period.

A NEW ASTRAGALUS.

T. S. BRANDEGEE.

ASTRAGALUS COCCINEUS. Perennial cæspitose densely white-hirsute: petioles nearly as long as the leaves; leaflets, 12–15 oval to obovate, obtuse, 6–10 mm. long; stipules triangular-lanceolate: peduncles considerably surpassing the leaves; flowers numerous shortly pedicellate, clustered near the top; calyx cylindrical slender, the linear nearly equal teeth $\frac{1}{3}$ the length of the tube: corolla spreading, bright red, 35–40 mm. long, double the length of the calyx; banner lanceolate: the oblong keel equalling it in length, very shallow and little curved not hiding the stamens, which are free for nearly one-fourth their length; keel and banner barely emarginate: pods an inch long resembling those of *A. Purshii*, but not mature and exact shape therefore not determinable.

Collected near the summit of the Inyo Range by Mr. G. P. Rixford, and by myself at Lone Pine on the slopes of Mt. Whitney.

This is without doubt the plant collected by C. R. Orcutt on the eastern slope of the mountains, bordering the Colorado desert, in San Diego County, for which Dr. Parry in West. Am. Scientist, vii, 10, doubtfully suggested the name *Astragalus Purshii* var. (?) *coccineus*. It is by far the handsomest Astragalus I have ever seen, forming in favorable locations hemispherical tufts a foot in diameter, the silvery leaves surpassed and nearly hidden by a profusion of bright red flowers an inch and a half in length. The widely separated banner and keel are of very different shape from those of its near allies.

THE USE OF BROKEN POTTERY AMONG INDIANS.

EDWARD PALMER.

In exploring Indian mounds along the Mississippi and Arkansas rivers and in Tennessee I have found, as is usually the case, broken pots of various sizes and designs associated with whole ones placed near the human remains; and in cases where the whole mound has been carefully examined without finding the missing fragments it is evident that they were used in the broken state no doubt as receptacles of food, medicine, or other objects belonging to the occupants of the mound, or placed therein as offerings by the friends. Water vessels are always to be found.

In seeking the explanation of any custom among primitive peoples the simplest is most likely the true one, and having observed among the Tarahumara Indians the very numerous uses to which fragments of pottery are put, it has occurred to me that to similar usages among the mound-builders we owe many of the fragments found therein.

In a dwelling of the Tarahumaras there may often be seen the half of a large water vessel or cooking pot inverted over a pile of ashes on the hearth—the housewife desiring to preserve her fire during absence takes this effectual method of doing it, for their houses being generally open the wind would otherwise blow away the ashes and uncover the fire. Parts of pots are often used as plates to hold portions of food, and parts of small ones sometimes are made to serve as spoons. If for any purpose an ointment is desired, a fragment of pottery will answer as a receptacle. The part of a large broken pot serves the Indian housekeeper as a vehicle for removing the ashes or dirt from her house.

As covers for vessels containing any substance liable to injury from exposure to the air or insects a fragment or half of a small vessel is used, tied on to make a tight fit by a rag or piece of buckskin, or by corn husks. At other times a flat piece is ground round and cemented, or something tied over it to keep it in place.

The earthen pot in which the Indian cooks his food has no cover, so part of another pot serves a good purpose especially when the cook's back is turned, for otherwise the dogs and chickens, always privileged parlor boarders in an Indian's hut, would steal the contents—if they were not boiling hot.

On the roofs at certain seasons may be seen parts of broken pots of various sizes containing beans, corn, water-melon, pumpkin and other seeds in process of drying for next year's planting. The chick-

ens are less likely to get at them there and they quite secure from the voracious dogs, which would make as much havoc among them as a horse.

Broken pots are used to feed and water the chickens and dogs, and would probably be used as washpans if the Indian mind could conceive of water as an external application.

In their primitive cupboards—shelves made of sticks lashed together—one is often surprised at the number of more or less broken vessels and their contents—salt, red pepper, dried meat, dried roots, berries, seeds of many kinds, old buttons, nails, odd tools for small domestic uses, with dyes, paints, etc.

Pieces of broken pots are used in making and smoothing new ones. I noticed one day a woman at the shady side of her house engaged in this very necessary occupation; on one side was part of a large water vessel filled with the crude clay, and part of an old cooking pot with sand to be used in tempering. She was working into the requisite shape a portion properly mixed and softened by the addition of water, using as a working board an old flat dish with the rim broken off. Near her were parts of several broken vessels in which to stand the newly made ones while slowly drying in the shade, thus obviating the necessity of direct handling in changing them about to secure the necessary evenness in drying. As broken pots are put to so many uses, it lessens the actual need of new ones, and the Indian in the absence of manufactories and left to his own resources is equal—that is his wife is—to the emergency and with clay and the patience which fortunately she possesses, produces the vessels which serve her simple purposes, nearly as well as the more ornamental and elaborate ones of civilized man.

PAULLINIA TORTUOSA (Benth.) *Cardiospermum tortuosum* described and figured in the Botany of the Sulphur is certainly a Paullinia. A recent examination of material collected at Magdalena Bay, the original locality, by Walter E. Bryant and by the writer, shows that the plant has five sepals, four discal glands and a septicidal capsule nearly filled by the 1–3 large seeds; leaves deeply impressed over the veinlets on the under surface and minutely papillose on the upper. The two anterior glands are conical, the white area at the base of the seed is bilobed and the lobes of the stigma elongated.

T. S. B.

CONTRIBUTIONS TO THE KNOWLEDGE OF WEST AMERICAN PLANTS. I.

KATHARINE BRANDEGEE.

CAMELINA SATIVA Crantz is abundant in fields and by the wayside near the Klamath River, in Siskiyou County.

PARONYCHIA CHILENSIS DC. Abundant in the western part of this city, from the Presidio at least as far as the southern end of Lake Merced. It was apparently first observed by Professor E. L. Greene, the earliest specimen in the Herbarium being labeled in his handwriting, "Presidio, San Francisco, April 21, 1887; E. L. Greene." It agrees perfectly with a specimen sent by Dr. Philippi from Chili, but not very well, with De Candolle's description, the calyx lobes more like those of *P. Bonariensis*. Possibly they are variations of the same species.

Ceanothus rugosus Greene, Flora Franciscana, 88. The really astonishing thing about this is, not that the author has applied a specific name to a plant which is "doubtless a hybrid" but that he from "his vantage ground of familiar knowledge" of our plants should be ignorant of the fact that neither *C. cuneatus* nor any other species of the Cerastes section, excepting *C. prostratus*, is to be found within thirty miles of Truckee.

MEDICAGO MARGINATA Willd. Almost as common about San Francisco, especially about the Marine Hospital and South San Francisco, as *M. denticulata*. It abounds also in places about Tamalpais and has been reported from Sonoma by Frank H. Vaslit.

MEDICAGO MACULATA Willd. Occasionally met with about Tamalpais.

HEUCHERA PILOSISSIMA Fisch. & Meyer, grows on the hills west of Noe Valley in an unusually stout, erect form.

SCANDIX PECTEN-VENERIS L. is extremely abundant in grain fields and by the waysides in the western part of Contra Costa County and in the streets of Oakland.

VALERIANELLA OLITORIA Poll. cultivated under the name "Doucette" has been recently collected by Miss E. Cannon, on the sand-hills in the western part of the city. It has been previously reported from Sweetwater, El Dorado County.

HELIANTHELLA CALIFORNICA Gray, has been collected this season by Frank H. Vaslit, on hills east of Ocean View in this city.

The specimens like those from the Sierra Nevada and from Howell Mountain, in Napa County, have awned akenes, but awnless specimens have been found by Mrs. C. M. Blake at Orinda Park, in the Contra Costa hills. It is probably much more generally distributed than has been supposed, being most likely confounded with *Wyethia angustifolia* to which it bears a considerable resemblance.

MATRICARIA OCCIDENTALIS Greene. This plant is abundant about the streets of San Francisco, especially about the suburbs towards the Presidio and the Marine Hospital. While it is sufficiently distinct from *M. discoidea*, the real differences are other than those given by the author, who describes *M. occidentalis* as "distinguishable indeed, more by its different habit and size, lack of fragrance, and its late flowering than by any striking characters of flower or fruit." *M. discoidea* though usually low and spreading is often tall and stout, especially in the interior of this state. As to the lack of fragrance and much later flowering of *M. occidentalis* any one who takes interest in the matter may at this date (May 15th) find them growing together inside the fences of abandoned gardens near First Avenue on the road to the Marine Hospital or within the southern boundary fence of the Presidio, and investigate the matter for himself. The flowers, though usually 4- are often 5-cleft; akenes oblong, thickened upward, 3-nerved, the upper nerve double, the lateral ones glandular in the upper half and continued upward as auricles. Unlike the better known species the akenes are very persistent and do not develop mucilage when wetted.

Neither of these species have the aspect or habits of indigenous plants; both probably coming to us from the north, and *M. occcidentalis* is perhaps the same as *M. inodora* var. *eligulata* Seem. Bot. Herald 33, which was collected on this coast at St. Michael, Norton Sound.

ANTHEMIS COTULA L. commonly known as "May-weed," is noted in the Botany of California, as "sparingly found along roadsides: introduced but not yet common." This remark must apply to the Coast region for I well remember when a child going to school through blossoming fields of such a robust growth as almost in turns of the pathway hid me from my companions. This was in 1854 at the village of Prairie City near the eastern line of Sacramento County. At the same place I saw for the first time the equally abundant "Milk-Thistle" *(Silybum marianum)*, the large

blotched leaves of which I greatly admired. Botanists who visit us in these later days when man and the omnipresent sheep have done their worst with our fair lands have small conception of the astonishing luxuriance of the vegetation springing from the then almost virgin soil.

TRAGOPOGON PORRIFOLIUS L. "Salsify" or "Oyster Plant" is now very freely naturalized in the northern part of the State.

LACTUCA SCARIOLA L. "Prickly Lettuce" is becoming established in Berkeley. It was abundant last year near the entrance of the University grounds.

ARCTOSTAPHYLOS NUMMULARIA Gray, was found by Mr. Brandegee three years ago, growing abundantly on the eastern side of Mt. Tamalpais, and he has since brought it from the northern slope of the Bolinas range. In these localities it blooms sparingly during nearly the whole year. The plants are rarely more than eighteen inches in height, of a bright glossy green. The tall form found on Ben Lomond in Santa Cruz county has duller, less rounded leaves, and though often eight feet high bears a much greater resemblance to *A. myrtifolia* of Amador County, which can hardly be more than a mere variety distinguished by its tetramerous flowers and less rounded leaves. Dr. Parry was in error in stating that the fruit of *A. nummularia* was covered by the persistent corolla. It is promptly deciduous in the thousands of plants observed in these various localities. The species appears to have a preference for the sandstone formations.

RHODODENDRON CALIFORNICUM Hook. "Rose Bay" has been recently collected on the side of Tamalpais above Corte Madera by Miss Belle Brown.

GILIA PARRYÆ Gray Proc. Am. Acad. xii, 76. *G. Kennedyi* Porter Bot. Gazette ii, 77. The peculiar appearance of the throat of this species described as produced by "a broad adnate and emarginate or obcordate scale"* is in fact caused by a series of arched saccate protuberances, one at the base of each segment of the corolla, and the external surface bears as many corresponding depressions. It is often a much larger plant than described, forming tufts three or four inches high and as broad. It has been brought from the Mojave Desert, from Tehachapi, from Walker's Basin, Kernville and Owens Valley.

*Syn. Fl. pt. i, 137.

BOSCHNIAKIA STROBILACEA Gray. This plant belonging to mountainous districts, and parasitic on the roots of Manzanita grows in profusion on Mt. St. Helena. Very large and fine specimens have also been collected by Dr. Anderson in the Santa Cruz mountains, and one in the herbarium of the California Academy of Sciences collected in the same region by Mr. E. Brooks, June, 1886, has the stem divided into two equal branches. Miss Alice Eastwood and Mr. Brandegee found it recently on Mt. Tamalpais.

The seeds are as Dr. Gray has said deeply favose, but varying in size from 1–2 mm. and are very irregular in shape from mutual pressure. The outer seed coat is nearly all "favosity," the inner is oval and similarly favose and the germ, which is barely visible to the naked eye, is apparently homogeneous and of similar shape and markings.

The accompanying plate (xiii) is photographed from a plant taken from the ground on Mt. St. Helena early in February. It was entirely underground, there was not even a swelling of the ground, and its presence was indicated only by the dead and dried spikes of the previous year. Upon the single tuber there were nine spikes, large and small, and in all the larger ones the flowers were already fully formed. The tuber which is usually found on roots of about the diameter of a goose-quill or a little larger are often two or three inches in thickness, dark brown, with the surface tessellated somewhat in the manner of the truffle. It evidently lives for a considerable time, drawing sustenance from its host, increasing in size and producing year after year in April and May its brownish-purple, cone-like spikes.

Dr. Gray says:* "I have now reason to think that *B. Hookeri* and my *B. strobilacea* may be the same." If he is correct, which is probable, the much to be preferred descriptive name will have to be given up.

COLOCHORTUS ALBUS Dougl. is often rose-colored. It is usually of that color but rather pale on Santa Cruz Island, as Mr. Brandegee noted, but appears in its usual pearly white on the mountains back of Santa Barbara. On Ben Lomond, in Santa Cruz County, it runs through all the shades from deep rose-color to white.

The deeper color appears to be quite frequent in the southern

*Proc. Am. Acad. xxii, 312.

Sierra Nevada. Examples from Dunlap, in Fresno County, collected by Mrs. Sophie E. Wilson, are rather small-flowered and of a deep rose color; the manifold gland nearer the base of the segments than usual.

This form is probably *C. amœnus* Greene, from the mountains east of Visalia. The author describes it by comparison with *C. pulchellus* and says, "petals more elongated, the ciliation longer, more lax and scarcely carried above the middle of the organ, the whole flower of a deep red-purple." This is a fairly good description of *C. albus*, as far as it goes (the author makes no mention of the gland), but it is difficult to understand why he compares it with *C. pulchellus*. In differential diagnosis, species are usually supposed to be compared with the nearest, but the author who is somewhat celebrated for "new departures" wishes perhaps to establish a precedent.

SCOLIOPUS BIGELOVII Torr. Very abundant in the Coast Range from Santa Cruz to Oregon and sufficiently conspicuous with its pair (sometimes three or four) of spotted, usually prostrate leaves. The flowers on account of their dull color and early appearance are less frequently collected than those of many less abundant plants. About Tamalpais they are to be found on damp and shady hillsides early in February.

The pedicels 2–8 inches long are triquetrous and somewhat winged on the angles, at first erect, elongating and becoming tortuous in fruit, and trying usually with success to hide their capsules under the leaves. The outer segments of the lurid purplish perianth are concave, thickened and shining at base. The connective of the extrorse anthers is much thickened especially at the upper part. The style branches though deeply sulcate their whole length are stigmatic only at the recurved apices, which in the young flower bend over touching the outer surface of the stamens. The capsules open by irregular fissures between the placentiferous angles which remain for some time attached at base and apex, forming a kind of framework from which the tissue falls away in minute scales—apparently disintegrating into its separate cells. The turgid seeds are 3–4 mm. long, pale in color, and minutely pubescent, the inner seed coat is deficient at the apex and the opening is plugged with a disk of soft tissue somewhat darker in color than the seed, and in drying shrinks forming a depression. The longitudinal lines

marking the seed are grooves in the albumen. The plant has an offensive odor, somewhat like chlorine.

It is not probable that *S. Hallii* is anything more than a geographical variation, our plant is variable in size, and the color and size of the capsules, which are pale when (as usual) hidden under the broad leaves, but brown-purple whenever by loss or depauperation of the leaves they are exposed to the sun.

THE DEHISCENCE OF MIMULUS.

The dehiscence of *Mimulus angustatus* (Greene) was wrongly described by the author* and by myself.† The plant is so minute that unless the locality is marked it is quite difficult to find them when the flowers have fallen and the leaves withered. For good and fully mature specimens I am indebted to Miss Eliza Clarke of Cahto, Mendocino County. The study of this material makes the dehiscence of the *Œnoe* section of the genus perfectly plain and shows that the separation from the basal portion if not effected by violence must take place very late. The gibbous, laterally compressed capsule opens when moistened, for two thirds the length of the upper suture never widely, and not all by the lower, and closes again in drying. The placentæ connate in the ovary as Dr. Gray observes are separated nearly to the base in maturity. The seeds marked on the face by a longitudinal darker line are sparsely covered with glochidiate hairs. The dehiscence of *M. latifolius* and of *M. Douglasii* is essentially the same. *M. tricolor* I have not yet seen in maturity. It is probable that the seeds of these small, early spring plants remain within their horny capsules until set free by the winter rains.

In a recent publication‡ Professor Greene in revising "Diplacus" makes the following statements:

"The present writer, with his advantages of long residence in the regions inhabited by these plants, is not yet acquainted with any transitions between the capsules of Diplacus and either Mimulus on the one hand or Eunanus on the other, and during the five years which have elapsed since he proposed the reinstatement of both these genera, he has met with no facts not confirmative of the view then set forth.

Mimulus in all its several phases has its placentæ (theoretically two) firmly and in so far as I know permanently coherent, thus forming a central column in the

*Bull. Cal. Acad. i, 99.

†Proc. Cal. Acad. ser. ii, 1, 260.

‡Pitt. ii, 152.

midst of the capsule, whose valves at first separate by a slight parting of their edges at the natural suture, ultimately breaking away irregularly and piecemeal from the placentiferous central axis. In Diplacus there is no such axis. The firm valves parting at first only by the upper suture, lie open like a boat-shaped follicle, each bearing its own distinct placenta, and that with a broad thin spreading margin which almost conceals the seeds. That this pod, at first boat-shaped by a partial dehiscence, is held in this shape by a tubercular enlargement of the base of the style, I have stated in the earlier paper cited in the foot note. * * * Diplacus has a completely revolute vernation, the young leaves in all Mimuli are more or less distinctly conduplicate, never revolute. * * * In the Supplement to the Synoptical Flora he [Dr. Gray] says of the various 'subgenera' of *Mimulus:* 'Diplacus is placed first as having the best claims to generic distinction.'"

There are in this sentence quoted from Dr. Gray, just two more words, which should not have been omitted as they distinctly modify its meaning.

Professor Greene in his anxiety to strengthen his position not only contradicts the published observations of Dr. Gray,* Dr. Watson,† and of the writer,‡ but conveniently forgets his own published notes to the same effect.§

The single species *Mimulus glutinosus* (Nutt.) now labors under the following synonyms: *D. latifolius*, *leptanthus*, *longiflorus*, and *puniceus* Nuttall; *D. stellatus* Kell.; *D. arachnoideus*, *linearis*, *grandiflorus* and *parviflorus* Greene; besides *Mimulus aurantiacus* Benth., etc.

That the author is far from careful in his statements, a few extracts from his own writings will serve to show. In the paper quoted above he says that he had stated in an earlier paper (Bull. Cal. Acad., i, 94 and 96), that the "pod" of Diplacus was held in boat-shape by a tubercular enlargement of the base of the style. Not only did he fail to make such a statement in the place cited, but in subsequent papers he uses the presence or absence of this inconstant

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*Supp. Syn. Fl., 450.

† "*Mimulus* (*Eumimulus*) *deflexus*. * * * The placenta splits at the apex." This is apparently the same as Mr. Greene's (Drew in herb.) *Eunanus pulchellus* published more than a year later.

‡Proc. Cal. Acad., ser. 2, i, 261.

§"As *Mimulus rubellus* diverges from the other Mimuli by separated placentæ, so *Eunanus Breweri* is aberrant from its congeners in having them firmly united below the middle." Bull. Cal. Acad., i, 102.

"tubercle" as a factor in determining specific differences. Another amusing instance is found under *Diplacus stellatus*. He says:

"Shortly after having proposed the restoration of this species on the ground of its accredited stellate pubescence, I collected it anew, and seemed to find that the stellate hairs on my own specimens as well as on those obtained by Dr. Veatch—hairs so extremely unlike what are found elsewhere in the genus, had been derived from an extraneous source."*

The author's previous statements concerning these "stellate hairs" are here given in chronological order:

"*D. stellatus* Kell. Branches and under surface of leaves yellowish-tomentose, the pubescence partly stellate and partly dendroid. * * * The pubescence of two different kinds is very plentiful in this plant, which is doubtless of a species distinct from all our mainland forms; although the dendroid hairs are on other species and even the stellate are not wanting elsewhere in the genus." Bull. Cal. Acad., i, 95., Feb., 1885.

"Was found again by the writer on Cedros Island, last May. The corolla is like that of *D. glutinosus* in form and color, but only half as large. The pubescence is chiefly a dense short yellow tomentum. The pod has the tuberculation. The species is, in my opinion, well confirmed." l. c., 210, August, 1885.

"Species exceedingly well marked by its stellate pubescence and rather small corolla." List of Cedros Plants, Pitt., i, 206; June, 1888.

There does not appear in these notices any evidence that the author "seemed to find" the stellate hairs a doubtful possession and one is reluctantly driven to the conviction that in a moment of forgetfulness he imagined himself the writer of the following:

"*D. stellatus* Kell. has been described as having very small flowers, entire leaves and a stellate (whence the name) pubescence. The specimen from which the description was drawn was badly dried and its characters obscured, but another brought since from the original locality shows that the leaves are dentate and the flowers of the ordinary size and form. The stellate pubescence is probably derived from some neighboring plant, being loosely involved in the tomentum and having no apparent connection with its host." Botanical Notes, by Mary K. Curran. Proc. Cal. Acad., ser. 2, i, 259, Dec. 11, 1888.

The author still divides his so-called species into "Corollas buff or pale salmon-color," and "Corollas blood-red or scarlet," although Mr. Brandegee has collected specimens on Santa Cruz and Santa Rosa Islands with flowers of both colors on the same plant, and the writer has collected and distributed specimens from near Alpine station, fifteen miles north of San Diego, in which the flowers vary on the same branch from pale-buff to deep-red.

* Pitt., ii, 155, Dec., 1890.

The capsule of *M. glutinosus* has a flexure near the base on the underside. It is most apparent on the growing ovary. The "tubercular enlargement of the base of the style" is not apparent till the ripening of the capsule, being produced apparently by the shrinking of the tissues above and below the point where the style ceases to be tubular.

The latest character brought forward to sustain Diplacus is its vernation. This differs from all other species of Mimulus known to the writer, but the difference is not nearly as great as Professor Greene has implied. The lower part of the leaf is somewhat conduplicate in *M. glutinosus* as in all the species, the hollowed surfaces of the opposite leaves forming a cavity for the growing shoot, the limb is revolute as stated. In wide leaved Mimuli the limb is more or less folded, but in species with somewhat narrower ones as our variety of *M. moschatus* it is almost plane, or the edges turned slightly backward.

[Since the note concerning *C. rugosus* was in print I have received a flowering branch of the plant from Mr. C. F. Sonne of Truckee. It bears evidence of its parentage, being without doubt *C. prostratus* X *velutinus*, and the first undoubted hybrid between the §Euceanothus and §Cerastes ever noted. Mr. Sonne failed to get fruit although he left flowers for the purpose. It is not probable that fruit will form in a hybrid of such dissimilar parents, though hybrids between the different species in each section are very common and apparently as fertile as any of the species. The only exception known to me is *C. incanus* X *papillosus*. which occurs occasionally on Ben Lomond in Santa County, and in all the examples observed failed to set fruit.]

Hybrids in all degrees, to all appearance as fertile as their parents are very common between *C. velutinus* and the other species, *C. corduLatus*, found in the vicinity of Truckee.

RECENT LITERATURE.

The American Naturalist for February contains a number of articles of interest to zoologists. Recent Studies of the Vertebrate Head by H. W. Norris. Also, Some of the Causes and Results of Polygamy among the Pinnipedia by C. C. Nutting; the best and most striking example of true polygamy among mammals is shown to be the northern fur seal *(Callorhinus ursinus)* of which the male weighs from three to nearly six times as much as the female. The species exemplified are walrus *(Odobænus rosmarus)*, hooded seal *(Chrystophora cristata)*, bearded seal *(Erignathus barbatus)*, sea elephant *(Macrorhinus angustirostris)*, Stellar's sea lion *(Eumatopias stelleri)*, and northern fur seal *(Callorhinus ursinus)*, in the order of their sexual disparity in size. "The writer has endeavored to account for the following peculiarities met with among the Pinnipedia:

1st. The relation between great sexual disparity in size and polygamy.

2d. The manner in which polygamy may have originated.

3d. The origin and effect of excessive pugnacity.

4th. The origin and advantage of great sexual disparity.

5th. The origin and advantage of the ability to endure long-protracted fasts."

W. E. B.

Description of Two New Species of Rodents from Mexico. By Henry L. Ward. American Naturalist, xxv, p. 158. The new species are *Spermophilus sonoriensis*, which is "apparently quite similar to Dr. Merriam's recently described *S. cryptospilotus*," and *Neotoma torquata*, which may be distinquished from all others of the genus by "a well defined collar, 20 mm. in width" upon the breast. The collar is light Vandyke brown, washed with black.

W. E. B.

Notes on a Collection of Mammals from Costa Rica. By J. A. Allen. Bull. Am. Mus. Nat. Hist., iii, 2, 203–218. A report upon a collection of thirty-eight species with annotations and yielding the following which are described as new: *Blarina costaricensis*, *Hesperomys (Vesperimus) cherrii*, *Hesperomys (Vesperimus?) nudipes* and *Hesperomys (Oryzomys) alfaroi*.

W. E. B.

On a Collection of Mammals from Southern Texas and Northeastern Mexico. By J. A. Allen. Bull. Am. Mus. Nat. Hist.,

iii, 2, 219–228. The collection upon which this paper is based was received from Mr. George B. Sennett and contained two new forms of which descriptions are given: *Scalops argentatus texanus* from Presidio County, Texas, and *Dipodops sennetti* from near Brownsville, Texas. Thirty-one species are recorded with annotations and critical remarks. W. E. B.

A Marine Reservation. Forest and Stream, xxxvi, No. 14. The commendable plan of reserving certain islands in the Pacific Ocean and Behring Sea as preserves upon which marine mammals may resort without molestation and thereby be kept from extirmination is presented in an editorial and a letter from Prof. Langley, Secretary of the Smithsonian Instution to Hon. John W. Noble, Secretary of the Interior. Briefly expressed, it is proposed to establish a northern station on Amak Island in Behring Sea for the refuge of the walrus *(Odobænus obesus)* and sea otter *(Enhydra marina)*, also a southern station on the Farallon Islands for the northern sea lion *(Eumatopias stelleri)* and California sea lion *(Zalophus californianus)*. W. E. B.

On the Periods occupied by Birds in the Incubation of their Eggs. By William Evans, F. R. S. E. Ibis, Jan., 1891, p. 52. It is partly compiled from the works and observations of others and partly the results of his own careful watching of nests and by the artificial means of a self-regulating incubator; eggs were also hatched under the domestic hen, dove and canary, according to the size of the eggs. The temperature best suited for hatching the majority of birds in the incubator was found to be 102.5° Fahr. The author says: "Probably no point in the life-histories of the different species of birds has received less attention than the period of incubation, a circumstance all the more surprising when we consider the importance of the subject and the great activity which has been manifested during recent years in the elucidation of ornithological questions." W. E. B.

The plates accompanying the January number of the Ibis are of *Æthopyga latouchii* Slater, ♂, ♀, a new species from south-eastern China; *Cryptolopha nigrorum* Moseley and *Abrornis olivacea* Moseley two new flycatchers from the Philippines, the third plate representing ♂, ♀ *Loriculus bonapartei* De Souancé from the Sooloo Islands.

Notes on the Classification of the Pigeons. By R. W. Shufeldt.

American Naturalist, xxv, p. 157. From a study of the osteological character of nearly all the genera of United States Columbidæ the author divides the family Columbidæ of the sub-order of American Pigeons *(Peristeræ)* into two sub-families, *Columbinæ* and *Starnœnadinæ;* the former containing the genera *Columba*, *Ectopistes*, *Engyptila*, *Zenaidura*, *Zenaida*, *Melopelia*, *Columbigallina*, *Scardafella* and *Geotrygon*, and the latter containing the genus *Starnœnas*. This arrangement differs from Coues, who divided the family *Columbidæ* into three subfamilies, viz: *Columbinæ*, *Zenaidinæ* and *Starnœnadinæ*. The details by which these conclusions were arrived at are not given in the present paper.

W. E. B.

The *Forest and Stream* of March 19 has an article on Doves Nesting in Trees, by S. A. BALL. No locality is given where the observations were made but it is undoubtedly eastern, where ground building may be the common practice with the mourning dove *(Zenaidura macroura)*, but on the western coast nests are oftener found in trees than upon the ground and in California it is a rule to which I recall no exception in scores of instances in my experience, although cases have been reported by others. The most interesting part of the article is the recounting of how he persecuted twenty-four nests belonging to fourteen species in order to ascertain to what extent the labor of constructing was lost by failure of the birds to hatch and rear their young. He says: "Here were twenty-four nests over which I constituted myself guardian, and which *I visited every day or every other day.*" [Not italicized in original.] After such a confession it is a matter of surprise that so many as six species (nine nests) succeeded in hatching part or all their eggs. Had he been more zealous he might have accomplished the breaking up of the domestic arrangements of every pair in his vicinity. Following this he bitterly complains of the investigations of scientists with but an allusion to the destruction of birds for millinery purposes.

A notable departure from terrestrial to arboreal nest-building could be cited in a number of instances where the California partridge has built in trees, upon hay-cocks in the field, upon covered hay stacks and once in a vine-covered trellis (Bull. Cal. Acad., ii, 452).

W. E. B.

The colored plates in the April issue of the Ibis are of *Galeopsar*

salvadorii, a new genus described by R. Bowdler Sharpe, LL. D., F. Z. S., etc., from a specimen collected by Mr. F. J. Jackson, F. Z. S., in Eastern Africa; *Drepanoplectes jacksoni* Sharpe another new species in which the male differs remarkably from the female. *Sycobrotus insignis* Sharpe and *Heterhyphantes stephanophorus* Sharpe are figured upon one plate. W. E. B.

Dr. R. W. Shufeldt contributes Some Comparative Osteological Notes on the North American Kites to the April Ibis. In critical concluding remarks he arranges the North American kites provisionally in the family *Milvidæ* with subfamilies *Ictiniinæ*, *Elanoidinæ*, *Elaninæ* and *Rostrhaminæ (?)*.

The plate with the April number of the Auk (vol. viii, No. 2) is a wood cut drawn by Mr. Ernest E. Thompson, representing the adult male and female and immature male Labrador duck (*Camptolaimus labradorius*). This species, which is probably extinct, is treated by Mr. William Dutcher in an article entitled The Labrador Duck, etc. There are at present thirty-eight recorded specimens of which twenty-seven are preserved in North American collections. No examples are known to have been taken since December, 1878.

Descriptions of Seven Supposed New North American Birds, by WILLIAM BREWSTER, contains descriptions of *eight* proposed subspecies, as follows: *Megascops asio aikeni*, Aiken's Screech Owl. *Megascops asio macfarlanei*, MacFarlane's Screech Owl. *Megascops asio saturatus*, Puget Sound Screech Owl. *Contopus richardsonii peninsulæ*, Large-billed Wood Pewee. *Ammodramus henslowii occidentalis*, Western Henslow's Sparrow. *Pipilo maculatus magnirostris*, Mountain Towhee. *Vireo solitarius lucasanus*, St. Lucas Solitary Vireo. *Sitta carolinensis lagunæ*, St. Lucas Nuthatch. W. E. B.

Observations on the Farallon Rail (Porzana jamaicensis coturniculus (Baird). By ROBERT RIDGWAY, Proc. U. S. Nat. Mus. xiii, 1889, 309–311. The present paper gives much important light upon the subject of the unique specimen of the Farallon rail and shows the possibility of its being identical with Gould's *Zapornia spilonota* from the Galapagos Island, and also shows wherein exists a doubt, unknown before, that the specimen was taken at the Farallones at all. W. E. B.

Flora Franciscana. Part I. By EDWARD L. GREENE, Assistant Professor of Botany in the University of California, 128 pp. San Francisco, 1891. The title of this work is somewhat of a misnomer, as it ranges over a district extending north and south from Cape Mendocino to Point Conception and from east to west the whole breadth of the State.

The reasons usually given for the publication of "Local Floras" are that they furnish more exact and fuller particulars concerning the localities and life history of plants than are usually given in works dealing with wider areas. In these respects the work is a distinct failure, scarcely any addition being made to the localities mentioned in the Botany of California—which is usually ignored—or any biological observation made that has not been already made public by previous authors.

The author's motto seems to be "change," and especially such change as will admit of placing his name after as many species as possible. The logic of these changes is past finding out. Eremocarpus is certainly quite as distinct from Croton as Cerasus and Amygdalus from Prunus; Malus from Pyrus, etc., and if Hosackia is to be reduced to Lotus, Horkelia to Potentilla and Limnanthes to Flœrkea, by what rule is he able to keep Heteromeles distinct from Photinia, "Alsinella" from Arenaria, or "Tissa" from Spergula?

In accordance with his well-known tendencies he inflates the genera with numerous species, either of his own making or from half-forgotten synonymy. Trifolium, for instance, is credited with forty-three, and Lupinus with forty-eight species in Central California! As Dr. Gray said on noticing in the American Journal of Science the first number of Pittonia: "The various new species of Trifolium, etc. * * * may be safely left to the final judgment of competent botanists. Professor Greene's judgment and ours are widely divergent," but the author's habit of uniting genera haphazard and renaming all the species with identical names in the absence of positive knowledge of their validity is a serious evil. The aphorism "once a synonym always a synonym" may apply to the naming of new species, but it is rather straining matters to make the rule retroactive.

The day which sees botanical names so well established as to be able to dispense with their authorities will be a very welcome one.

The attempt to disturb nomenclature by referring generic names to ancient authors in whose records they appear with more or less uncertainty is at this day almost beneath serious notice. Mr. Britton in the Torrey Club Bulletin for May, well says: "How can he in any event safely credit a name to Dioscorides or Theophrastus? They surely did not originate such terms as *Astragalus* and *Sorbus*, but merely recorded what certain plants were called in their time." Surely even Professor Greene must be able to see that if these names and others in common use are to be so credited, the numerous others which are either not used at all, or used for entirely different plants than those to which they were originally applied, have an equal right to restoration. And where is a stopping place to be found? Have the vernacular names recorded by Greeks and Romans any better claim than the far older ones of the Hebrews, the Egyptians, the Hindoos or the Chinese? A large number of the names of Theophrastus, etc., have been identified, but some mousing antiquarian excavating about Jerusalem may furnish us at any time with the records of Solomon, who "spake of trees, from the Cedar tree that is Lebanon even unto the hyssop that springeth out of the wall."

If *Prunus* is to be credited to Varro, *Rubus* to Virgil and *Amygdalus* to Theophrastus, why not say *Apios* Theophrastus, instead of *Malus* Tournefort? But then there is a still older name given by irrefragible authority—the Hebrew *Ez*, mentioned in Genesis; and *Cerasus* even when credited to Theophrastus is certainly long antedated by *Bimba* of the Mahabharata.

K. B.

Revision of the American species of Epilobium occurring north of Mexico. By WILLIAM TRELEASE; pp. 118, 48 plates. Extract from the second Annual Report of the Missouri Botanical Garden. Issued April 22, 1891. This work shows the usual painstaking study for which the author is so well known. The genus is a very difficult one, many of the species forming fertile hybrids, which are, in the absence of extensive field studies, a source of much perplexity. The author is very conservative in his dealings with the species. He says: "I have tried as far as possible to account for all species indicated by him [Haussknect] and other writers as coming within our limits, recognizing them as valid whenever satisfactory reason could be obtained for doing so. It is with reluctance that I publish several as new. It must be said, however, that increasing familiarity

with the genus strengthens my impression that the characters here admitted as of specific value are worthy of credence, and do not apply to mere forms or varieties, although the less differentiated species fall into groups, which some of the most conservative botanists might justly treat as species consisting of fairly marked subspecies, in a monograph of the genus as a whole." The new species are *E. delicatum*, *E. clavatum*, and *E. ursinum* Parish in herb. The recently described species reduced are *E. pseudo-lineare* Hausskn. "unknown to me, and suspected by Professor Haussknect to be a hybrid of uncertain parentage;" *E. Americanum* Hausskn. reduced to *E. adenocaulon; E. exaltatum* Drew. reduced to a variety of *adenocaulon;* and *E. Oreganum* Greene, considered a hybrid of *glaberrimum*, with perhaps *adenocaulon*. The plates are of much value in the future study of the genus. K. B.

American Garden, xii, 247, makes an amusing contribution to the literature of *Rhamnus Purshiana*. It is described over the name of a contributor as "A very low, pretty shrub with bright scarlet berries, handsome light green, deciduous leaves and cinnamon-colored stems. The tiny greenish-white flowers have four or five petals and stamens." The accompanying figure represents *Prosartes Hookeri*.

Botanical Gazette, February, 1891. Notes on the apical growth of Osmunda and Botrychium (with pl. v.): Douglas H. Campbell. Two new plants (*Luina Piperi, Silene Suksdorfii*), from the Cascade Mountains (with pl. vi.)—B. L. Robinson. New species of Montana fungi (with pl. vii.)—J. B. Ellis and F. W. Anderson. Key to the North Amerian Genera of Labiatæ.—Alfred C. Stokes. Observations on the new Texas fern, *Notholæna Nealleyi* and var. *Mexicana*—George E. Davenport. *Sarcodes Sanguinea*—Thomas Meehan.

March, 1891. Black rust of cotton—George F. Atkinson. Flowers and insects, vi—Charles Robertson. Notes on Technique, ii—James Ellis Humphrey. A contribution to the life history of *Hydrastis Canadensis* (with pl. viii)—Homer Bowers. Two undescribed species (*A. Pringlei, A. globosa*) of Apodanthes (with pl. iv)—B. L. Robinson. *Erythræa Pringleana* Wittr.—C. G. Pringle. New species of Montana fungi (with pl. x)—Ellis & Anderson.

April, 1891. New or noteworthy Compositæ from Guatemala—John M. Coulter. Notes on North American Willows, vi (A review

of the Willows of California, a paper of much interest to Western botanists—M. S. Bebb. Notes on the Flora of the St. Croix region —E. G. Hill. A new Aster from California, *Aster Orcuttii*, Vasey & Rose.—J. N. Rose (with pl. XI).—A new Fomes from Montana (*Fomes Ellisianus* Anders.)—F. W. Anderson. *Silphium laciniatum* L.—B. L. Robinson. The propagation of *Ranunculus lacustris*—Charles A. Davis. *Cornus Baileyi* in Oregon—Walter H. Evans.

Contributions to the Knowledge of the Germination of some North American Plants (with plates v–xix). By THEODOR HOLM. Mem. Torr. Club, ii, No. 3. Such papers as this which really add something to the sum of our knowledge are a welcome relief from the surfeit inflicted upon us by a crowd of systematic botanists, many of whom seem to have no idea of botany, beyond the describing of new species, or chasing the names of plants through a lot of old books and changing them if possible. The germination and early growth of more than forty plants is described and delineated. We hope the author will continue his studies in the line he has marked out.

K. B.

Bull. Torrey Club, xviii, No. i. Notes upon Uvularia Oakesia Diclytra and Krigia, (pl. cxi–cxiii): Theodor Holm. Recent Contributions to the literature of the Diatomaceæ: C. Henry Kain. A new Anthracnose of Peppers: Byron D. Halsted. Notes on the Archegonium of Ferns: Douglas H. Campbell. Virginia creeper: Thomas Meehan.

No. ii. Enumeration of the Plants collected by Dr. H. H. Rusby in South America, 1885–1886.—xv: N. L. Britton. The Flora of the Desert of Atacama: Thomas Morong. Contributions to American Bryology (pl. cxiv.): Elizabeth G. Britton. Zizania as found by the Explorers of the Northwest: E. J. Hill. A new locality for *Lychnis Floscuculi:* C. L. Shear.

No. iii. Study of the Apical Growth of the prothallium of Ferns with reference to their Relationship (pl. cxv.): Douglas H. Campbell. Influence of Moisture upon dehiscent Fruits (pl. cxvi.): B. D. Halsted and D. G. Fairchild. Notes from Pennsylvania: Thomas C. Porter.

No. iv. The Formation of the Flower Buds of Spring-Blossoming Plants during the preceding summer: Aug. F. Foerste. Enumeration of the Plants collected by Dr. H. H. Rusby in South America, 1885–1886–xvi: N. L. Britton. The Fertalization of

Three Native Plants: E. J. Hill. Variations of the Rootstock of *Similax glauca* dependent upon Environment: Wm. T. Davis. An Undescribed Desmodium from Texas and Mexico: Anna Maria Vail. Plants of Special Interest collected at Orono, Maine. Merritt L. Fernald.

Third Biennial Report of the State Board of Forestry, for the years 1889-90. 8 vo., pp. 212. The first part of the volume is devoted to a report by W. S. Lyon, State Forester, on the progress made in introducing and acclimatizing foreign trees; the second part by John Gill Lemmon, botanist of the Commission, contains an account of the Conifers of the Pacific Coast, enriched by many photographs. A new genus, *Hesperopeuce*, is proposed for the well known *Tsuga Pattoniana*.

Journal of Mycology, vol. 6, No. ii, published by the Department of Agriculture. A new Hollyhock disease, *Colletotrichum altheæ*, by Miss E. A. Southworth. Recent Investigations of Smut Fungi and Smut Diseases by Dr. Oscar Brefeld, translated from *Nachrichten aus dem Klub der Landwirthe zu Berlin*, a paper of very great interest. The author details numerous experiments with the smuts *Ustilago carbo, U. cruenta* and *U. maydis*, undertaken to determine the period of infection. The experiments tend to show that in slender plants with necessarily minute and well covered growing points, infection apparently takes place very early, in most cases, soon after the appearance of the plumule, but exceptionally, and in Maize and Sorghum frequently, if not nearly always, the young tissue may become affected at any part of the plant.

The spread of smuts in fields was found to be very greatly promoted by the use of fresh dung.

The number also contains some notes of interest on A New and Destructive Oat Disease, by B. T. Galloway and E. A. Southworth; Note on a Minnesota species of Isaria and an attendant Pachybasium, by Conway MacMillan; A Few New Fungi, by J. B. Ellis and S. M. Tracy, and a new species, *Mucronoporus Andersonii*, by the former.

H. W. H.

PROCEEDINGS OF SOCIETIES.

California Academy of Sciences. *March 2, 1891*, President Harkness in the chair.

Donations to the Museum were reported from the following: L.

Belding, Robt. A. A. Wright, M. Braverman, B. C. Winston, Geo. W. Dunn and Melville Attwood.

The Librarian reported 140 additions to the Library.

Dr. H. H. Behr read a paper on "Botanical Reminiscences."

Walter E. Bryant read a paper entitled "A Provisional List of the Land Mammals of California."

The Secretary read an account of the discovery of precious opals near Moscow, State of Washington, and exhibited specimens in the matrix presented by Melville Attwood.

The following communication was read:

SAN FRANCISCO, March 2, 1891.

To the Officers and Members of the California Academy of Sciences:

I hereby present to this Academy my collection of Fungi, now in this building, in the gathering and identification of which I have devoted the major portion of my time during the past fifteen years. The collection consists of between 10,000 and 11,000 numbers, which are catalogued by the card system, nearly 13,000 separate cards having been required for the work.

The catalogue is arranged for immediate use and the specimens are already in convenient receptacles.

Yours respectfully, H. W. HARKNESS.

A vote of thanks was unanimously tendered to Dr. Harkness for his valuable gift.

The report of the Director of the Museum, which had been deferred from a previous meeting, was read and filed.

April 6, 1891. There not being a sufficient number of members present the meeting was merely called to order and adjourned.

CALIFORNIA BOTANICAL CLUB.

In response to a call from Dr. H. W. Harkness, Dr. H. H. Behr, Dr. Gustav Eisen, T. S. Brandegee, Mrs. Mary W. Kincaid, Miss Agnes M. Manning and Mrs. Katharine Brandegee, a meeting was held at one P. M., on March 7, 1891, in the herbarium room of the California Academy of Sciences.

The meeting was called to order by Dr. H. W. Harkness, who briefly explained that the objects of the proposed Club were to promote the study of plants, especially those found on the Pacific Coast of North America, and by bringing into more intimate relations the botanists of the Coast to arouse a greater interest in so rich a field of science. All persons joining the Club were invited to meet the botanical curator of the California Academy in the herbarium room

every Monday afternoon for the study of living plants. He then suggested that the election of officers was the first business in order.

The following officers were elected for the first term ending the first Saturday in March, 1892.

President—DR. H. H. BEHR.
Vice-President—MRS. MARY W. KINCAID.
Secretary—FRANK H. VASLIT.
Treasurer—MISS AGNES M. MANNING.
Librarian—MISS CAROLINE L. HUNT.
Curator—MISS KATE ELLIOTT.
Councilors—MRS. C. E. HANSEN, MRS. M. J. MCDONALD, DR. C. M. BLAKE.

The Committee on Constitution consisting of Dr. H. H. Behr, Mrs. Mary W. Kincaid and Miss A. M. Manning, appointed at a preliminary meeting, presented a report embodying the Constitution engrossed upon pages 1–4 of this record, which report was read and adopted.

It was decided to meet for the present on the first and third Saturdays of each month at 1 P. M. in the herbarium room of the California Academy of Sciences, the meetings to be followed whenever practicable by an excursion to some place of botanical interest.

The Club then adjourned for an excursion to Mountain Lake.

March 22, 1891. In the absence of the President, the Vice-President, Mrs. M. W. Kincaid, presided.

On motion it was decided to keep the charter roll open for signatures during the month of April.

Adjourned for excursion to Laurel Hill.

April 4, 1891. The Vice-President in the chair.

It was announced by order of the Council that the regular business meeting would be held on the first Saturday of each month to be followed by an excursion, and that the third Saturday of each month would be devoted to a field meeting. Also that, as heretofore, there would be excursions on Sunday, as quite a number of the members were unable to spare the necessary time on any other day, and that the Club, or as many as could attend, would continue to meet for the study of plants brought in every Monday afternoon from 3:30 to 5 P. M.

Adjourned for excursion to the Presidio.

May 2, 1891. Mrs. C. E. Hansen in the chair.

The Secretary announced that in accordance with instructions from the Council, he had communicated with the officers of the California Academy of Sciences, soliciting the use of the Hall of the Academy for one night during the month, and that through the efforts of Dr. Harkness, and in consideration of the fact that the investigations and collections of the Club would tend to enrich the herbarium of the Academy, the request had been granted,

On motion a vote of thanks was tendered to Dr. Harkness.

The thanks of the Club were also voted to Mr. T. S. Brandegee for his donation of the two volumes of the Botany of California and the first volume of Zoe, and also to Mr. George Spaulding for printing without charge 250 receipts for dues.

The following notes by Miss E. Cannon on plants not hitherto known as growing in San Francisco, were read:

SANICULA MARITIMA Kell. A new locality for this plant is a half marshy depression in the Potrero Hills at the end of Eighteenth street. It grows there in stiff black clay called "adobe" which is very wet in winter and spring, but is nearly dry at this time. The plants are, as seems usually to be the case with vegetation near the coast, lower and more spreading than those from Alameda. It is associated at this place with *Eryngium petiolatum* and probably occurs in other similar localities, but is so inconspicuous and the foliage so exactly the color of *Ranunculus muricatus* and *Plantago major* that it is not easy to find.

GILIA LINIFLORA Benth. stouter, more spreading, but lower and with larger flowers than any of the specimens in the herbarium of the California Academy of Sciences, grows on the summits of the Potrero hills.

GAULTHERIA SHALLON Pursh., "Salal" of the Northern Indians, is found on the summits of the hills on both sides of Noe Valley, growing only a few inches in height, but flowering freely.

On motion the charter roll was declared closed with the following signatures:

H. W. Harkness,
Mary W. Kincaid,
Katharine Brandegee,
Caroline L. Hunt,
Mrs. Paris Kilburn,
Ella L. Manson,
L. M. F. Wanzer,
Nellie Williams,
Evelina Cannon,
Florence Emerson,
H. H. Behr,
Emily V. Harrison,
T. S. Brandegee,
Ernestine J. Arnold.
Edith B. Falkenau,
Lucy F. Swett,
Jessie Andrus,
Mrs. R. F. Dodd,
Mrs. L. D. Emerson,
Jessie S. Easton,

Emily A. Easton,
Mrs. M. J. McDonald,
Bertha Tackle,
H. T. Bickel,
Daisy A. Loughlin,
George F. Kincaid,
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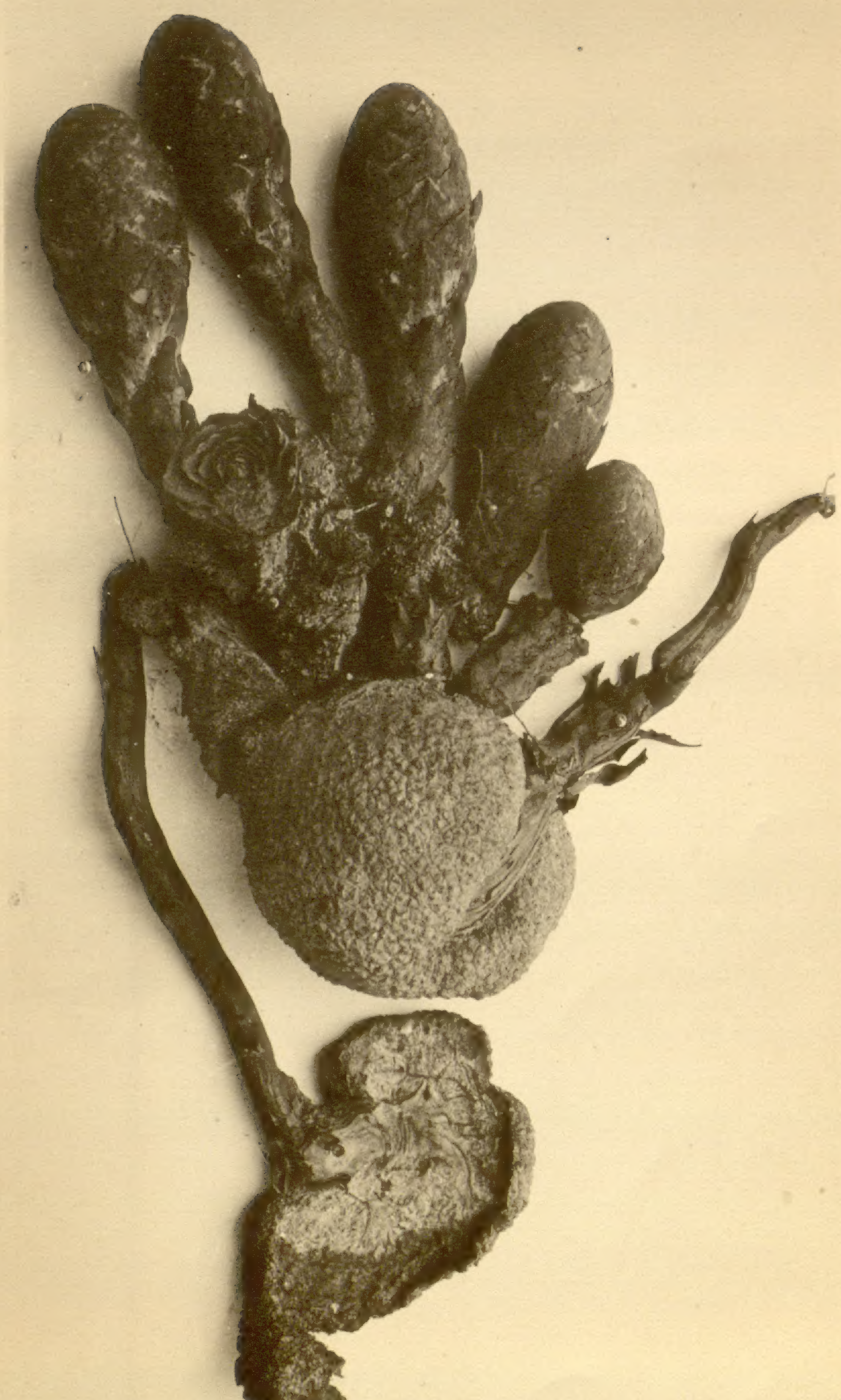
John McLaren.

Notice was given that the next meeting would be held at 8 P. M. on Thursday evening, May 21, in the Hall of the Academy of Sciences.

The society then adjourned for excursion to the hills south of the Park.



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